APPENDIX A

DATA MANAGEMENT SUMMARY REPORT (ECOCHEM, 2000)

Data Management Summary Report

Fox River Remedial Investigation/Feasibility Study

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Prepared for:

Wisconsin Department of Natural Resources
101 S. Webster Street
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October 3, 2000

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October 3, 2000

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1 Introduction

This report summarizes the processes and data utilized to create the Fox River Database (FRDB). The FRDB was created to provide data management support to the Lower Fox River Remedial Investigation/Feasibility Study (RI/FS) and Risk Assessment (RA). The data management and data quality assessment have been conducted with two primary goals in mind:

- The identification and incorporation of available electronic data sets for immediate use in the support of RA and RI/FS activities and the assessment of these data sets for overall quality and defensibility.

- The generation of a useable database of Fox River data produced through the identification, acquisition, review (quality assessment or validation), catalog, classification, and archive of all available data (electronic and hardcopy) pertinent to the Fox River RA and RI/FS.

Environmental data generated by numerous sources in support of several different actions on the Fox River were collected and assessed for overall quality and included in the FRDB.

For the purposes of this document the following definitions will apply:

- **Data Set -** an electronic set of data that is associated with or is identified by a unique study name or sampling event. Identified data sets were submitted in many different formats (e.g., spreadsheets, databases, ASCII files, etc.).

- **Sample –** a unique, representative fraction of a matrix of interest (sediment, fish tissue, water, etc.) collected during a discrete time period.

- **Record –** collection of all data associated with a single analytical result in the FRDB (location, qualifiers, comments, etc.).

- **Data Validation (DV) -** data validation is the process of independent data review which provides information pertaining to limitations of data based on specific quality control criteria.

- **Useable Data -** useable data have been thoroughly assessed through review of the analytical data itself and associated quality assurance/quality control (QA/QC) documents. The data are of known and verifiable quality. Useable data is identified as such in the "qa_status" field in the FRDB.

- **Supporting Data -** supporting data have not been subjected to as rigorous an assessment as the useable data. As such, the precise data quality is not known. This is due to insufficient or incomplete QA/QC information available at the present time. In these cases, QA/QC information may or may not exist. The collection and assessment of this information might render the data fully useable. Until a full data validation is conducted, these data should be used for supporting purposes only. Supporting data is identified as such in the "qa_status" field in the FRDB.

- **Indeterminate Data –** status of a data set is described as indeterminate if: it is unknown whether the data set has been validated, and/or, QC data to support validation is not available. Indeterminate data is identified as such in the "qa_status" field in the FRDB.

2 Data Collection

2.1 Electronic Data Collection

The data management process began with the initial collection of electronic data sets from the Wisconsin Department of Natural Resources (WDNR) the week of March 30, 1998. The data collection effort proceeded in two stages, corresponding with the report delivery schedule developed for the RI/FS and RA documents. Data collection for Stage 1 continued through November 30, 1998, and all data were available to support the Draft RI/FS and RA documents published in February of 1999. Stage 2 of data collection began in March of 1999, and continues through the present (May 2000). Data were received in many different formats and were reviewed, standardized, and organized into a database-compatible format. The following table lists the data received and the stage that it was collected.

Data Source	
Stage 1	**Stage 2**
1989–1990 Fox River Mass Balance Study	1997 Demonstration Project Data - Deposit N
1989–1990 Green Bay Mass Balance Study (GLNPO)	1997–1998 Demonstration Project Data - SMU 56/57
1992–1993 BBL Deposit A Sediment Data	1998 FRG/BBL Sediment/Tissue Data
1993 Triad Assessment	1998–1999 Deposit N Data:
1993 USFWS Tree Swallow Data	Remediation
1994 GAS/SAIC Sediment Data	Pre-Dredge
1994 Woodward-Clyde Deposit A Sediment Data	Post-Dredge
1994–1995 Cormorant Data	Operational Monitoring
1995 WDNR Sediment Data	1998 FRG/Exponent Data
1996 FRG/BBL Sediment/Tissue Data	1999 Demonstration Project Data - SMU 56/57
1995–1996 WDNR Fish Tissue Data	Ankley and Call Data
1997 USFWS NRDA Waterfowl Tissue Data	State of Michigan Fish Consumption Advisory Data
1997 WDNR Caged Fish Bioaccumulation Study Data	Lake Michigan Mass Balance Data
1998 RETEC RI/FS Supplemental Data	Lake Michigan Tributary Monitoring Data
Fox River Fish Consumption Advisory Data	Minergy Mineralogical Data
Lower Fox River Background Metals Assessment	
Stromberg Eagle Data	
1996–1999 USFWS NRDA Fish Tissue Data	
USGS NAWQA Data	
WDNR Wildlife Tissue Data	
WPDES Permit Influent Data	

2.2 Collection of Historical Analytical Data and Supporting Quality Assurance and Quality Control Documents

The goal of the review was to assess previously generated analytical data sets and associated Sampling and Analysis Plans (SAPs), Quality Assurance Project Plans (QAPPs), Laboratory Standard Operating Procedures (SOPs), and other project-specific documents. Historical data (both hardcopy and electronic) and supporting QA documents were collected for review and verification.

3 Data Manipulation and Assessment

3.1 Data Management and Data Validation Overview

Most of the data sets required a substantial amount of manipulation to transform the structure to a common database format. The data were usually obtained from report documents that had undergone extensive formatting. This formatting had to be removed to restore the data set to its most basic state and transform individual data sets into a useable condition.

The formats in which data were received are included in Table 3-1. A brief description of how the data were adapted is provided below.

- **Spreadsheet:** Numerous data tables were provided in spreadsheets, but not necessarily in a database-compatible format. It was often necessary to manually rearrange data within the spreadsheet from a horizontally oriented format (multiple results on a single line) to a vertical format (one individual result per record). Spreadsheet columns were then rearranged into the proper record order as necessary and the file appended to the FRDB.

- **ASCII:** Data were imported into a spreadsheet or database table. The table was then checked to verify that the information was separated into individual fields properly. Information was then rearranged into the proper record order as necessary and the file appended to the FRDB.

- **Database:** Data were provided in multiple database formats. When necessary, the data were exported to FoxPro tables. Field headers were then standardized to match the established database format and the file appended to the FRDB.

- **Hardcopy:** Information was provided in a written report with data tables (one data set only). Information was gathered from the tables provided and the supporting text. The data were hand entered into an empty spreadsheet table with the same record setup as the database. All hand-entered information was proofread by a second party to insure accuracy prior to inclusion in the FRDB.

In addition to reducing the data to a database useable format, the disparate data sets required standardization. This process consists of developing master lists of acceptable entries for pertinent data types (valid value lists) and verifying that all new data sets conform to those master lists. The following items offer examples of the standardization that took place:

- A single analyte list was developed in order to account for different naming conventions reported by multiple laboratories. A cross-reference table was used to update each data set to a standardized list of analytes. For example, all instances of 4,4'-DDT were changed to p,p'-DDT and all PCB congener results were put into the format "PCB Congener XXX." The original analyte name as received in the import file is maintained in the "analyte_old" field of the FRDB.

- Units were standardized to parts per million (mg/L or mg/kg) for inorganic constituents and parts per billion (mg/L or mg/kg) for organic analytes. Two different possibilities exist for unit changes: unit changes that do not require numeric calculations, e.g., ng/ml to mg/L (both represent parts per billion units) and units changes that require numeric calculations e.g., 10 mg/kg changed to 0.01 mg/kg. All original values and units were concatenated and placed in the "result_old" field of the FRDB.

- Qualifiers were standardized to the extent possible. For the most part, this consisted of changing "<" signs to "U," and interpreting laboratory-assigned qualifiers. Where this information is unavailable or has yet to be obtained, original qualifiers have been maintained. In those data sets where multiple qualifiers are available (laboratory qualifiers and validation qualifier), the multiple qualifiers have been merged to a single qualifier (i.e., "U" qualified from laboratory and "UJ" qualified by the validator = "UJ" qualified). When non-standard qualifiers where present in data received, the data provider was contacted and a list of qualifiers and definitions was requested. Qualifiers where standardized accordingly. The original qualifiers received in the import file are maintained in the "qual_old" field of the FRDB.

- All sample dates were standardized to one common data format where possible: mm/dd/yyyy.

- The media field was populated using a standard list of sample matrices: ambient air, pore water-sediment, sediment, tissue, or water.

- The species (common name) was standardized. For example, Northern Pike was also listed as N. Pike, northern pike, and Northern pike. The most accurate descriptor was chosen and all permutations were changed to match.

- The sample type (whole body, surface sediment, fillet skin-on) was standardized.

- Sample depth was standardized to measurement in centimeters. For some sediment samples, the sampling depth was included in the sample identification. This information was moved to the "depthfrom" and "depthto" fields in the database. Units of measurement were placed in the "depthunits" field.

Beyond the standardization process, information was added to delivered data sets in order to provide unique information where required, and to enable grouping of information (by location, analysis type, etc.) in support of the RI/FS or RA.

- Unique sample identifiers (IDs) were generated for samples that did not have a single unique identifier. Tissue samples generated by different researchers often had identical sample IDs. In these cases, a letter in parenthesis was appended to the original sample ID to indicate the researcher [(P) - Patnode data, (S) - Stromberg data, etc.]. In other cases, multiple researchers used an identical counting scheme to identify samples, based on the year and the numerical sample count (i.e., the first sample in 1995 was 95001, the second was 95002). In cases where more that one researcher collected samples in this manner, the samples were identified as 95001a, 95001b, and so forth. Water samples were often analyzed as filtered and unfiltered, or filtered and particulate. When such samples had similar sample IDs, a (U) – unfiltered, (F) – filtered, or (P) – particulate was appended to the sample ID making it unique.

- Individual samples from various data sets were assigned location information to allow for spatial association to other data sets. All samples were assigned one of the following nine designations:

background or reference; Little Lake Butte des Morts; Appleton to Little Rapids; Little Rapids to De Pere; De Pere to Green Bay; Green Bay Zone 2 (2A & 2B); Green Bay Zone 3A; Green Bay Zone 3B; or Green Bay Zone 4. Descriptive location information and coordinate information were used to successfully associate 99.9 percent of the samples with one of the above areas. Where possible, samples collected on the upper stretch of the river were also associated with the deposit from which they were sampled.

- The "northing" and "easting" fields contain specific coordinate information provided by the originator of the data or WDNR based on original site mapping.

- The "lab" and "validator" fields were populated if the information was available.

- The spelling, case, and date format (where applicable) were standardized for the fields titled "Source," "Methodtype," "Group," "Group2," "Importfile," and "Timestamp."

- The following fields were populated if the information was provided: "labid," "date_recd," "date_ext," "detlimit," "sdg," "aliquot," "method," "blind_id," "sampler," "comment," "loc_description," and county." No standardization was applied to this information.

Tabular results of analysis for all data sets included in the FRDB are provided in Table 3-1.

The quality assessment of the historical data followed a stepwise approach. First, it was determined whether the data had been subjected to an independent third-party data validation. If the data were validated and the validation report or validation worksheets were available, they were reviewed. If the validation was determined to follow basic U.S. EPA quality assurance guidelines (at a minimum), the data were considered to be acceptable for use (useable) in the RI/FS and risk assessment decision-making process.

If the data were not validated or concurrence was not reached with the previous validation (and the QC results were available), a limited review was performed. All available documents were reviewed to determine what quality control measures were included and what data quality objectives (DQOs) were required. The measures of accuracy and precision were evaluated against either

the control limits/DQOs in the QAPP, the method, the laboratory SOPs, or U.S. Environmental Protection Agency (EPA) National Functional Guidelines. QC elements such as sample duplicates, matrix spike/matrix spike duplicates (MS/MSD), laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and field duplicates were acceptable measures of precision. QC elements such as blanks, calibration standards (initial and continuing), surrogates, MS/MSD, LCS/LCSD, and standard reference materials (SRMs) were acceptable measures of accuracy. A determination of the usability of the data was made from the findings of these reviews. The analysis of the available QA/QC elements for each data set are summarized in Table 3-2.

3.2 Data Sets

The reduced and standardized data sets were compiled in a working database for use in support of the ongoing RA and RI/FS. This interim database is essentially a large flat file, currently containing more than 450,000 records from 35 individual data sets. Each data set is discussed in the following subsections of this report.

3.2.1 1989–1990 Fox River Mass Balance Study and 1989–1990 Green Bay Mass Balance Study (GLNPO)

The 1989–1990 Fox River Mass Balance data were collected by WDNR along the length of the river in 1989 and 1990. The sediment and water matrices of this data set were received from WDNR in six spreadsheet files (1989-1.wks, 1989-2.wks, allsed.wks, basic-5.wks, deep-cor.wks, and gravity.wks). These spreadsheets contain polychlorinated biphenyl (PCB) congener and total PCB concentrations, as well as grain size and total organic carbon (TOC) information. Each file exists in a unique format and was transformed into a standard database format. These data represent 1,967 samples and 25,457 analytical records in the FRDB. Data management occurred during Stage 1 of the data collection process.

The Green Bay Mass Balance (GBMB) data are represented in their entirety in the files posted on the Great Lakes National Program Office (GLNPO) website. Several mass balance studies have been conducted by different regulatory agencies and groups. Consequently, there is a significant overlap of data which is considered "common" data within the different studies. Redundant data identified in the collective GLNPO set were segregated and removed prior to inclusion of the GLNPO data into the FRDB (2,069 samples and 201,701 records). Data management occurred during Stage 1 of the data collection process except for the phyto- and zooplankton fractions of the data. These

data were originally omitted from the FRDB. During Stage 2 of the data collection and management process, these data were determined to be required for food chain models and were added to the FRDB.

Samples were analyzed and data were generated by eight different laboratories for the GBMB study. Seven of the laboratories performed PCB analyses; one laboratory performed metals analyses. Each of the seven laboratories analyzing samples for PCBs were required to analyze a series of 10 performance evaluation (PE) samples (of differing concentration levels) prior to analyzing samples for the study. The results of these PE sample analyses were available for review by EcoChem for four laboratories. A wide range of percent recovery (%R) values were reported (60% to 233%).

Prior to the study, each laboratory was given a copy of the document, *Quality Assurance Plan Green Bay Mass Balance Study - PCBs and Dieldrin*, which outlined general guidelines and data quality objectives. According to this document, data sets generated for the GBMB Study were reviewed and approved by the Green Bay Quality Assurance Coordinator (QAC) prior to the release of data. EcoChem, Inc. interviewed the GBMB QAC at the University of Minnesota in September 1998 regarding the data review procedures. It was determined from that meeting that the data were not fully validated. The review of the data consisted of verification of laboratory-generated QA/QC forms prior to data release. A formal comparison to any specific project DQOs was not made, thus no validation qualifiers were assigned to the data.

One participating laboratory, the Wisconsin State Laboratory of Hygiene (SLOH), was visited by EcoChem personnel who interviewed analysts and managers. Sample handling, preparation, and analysis systems were reviewed. In-depth discussions occurred concerning peak identification and quantitation. All hardcopy and electronic data are available and could be validated if requested. The disposition of the data and supporting information for the other labs is not known. Thus, it was determined that, in general, the data from the GBMB Study should be used as supporting data only. Refer to 2.2.18 for a discussion of the review of more recent data generated by SLOH.

3.2.2 1992–1993 BBL Deposit A Sediment Data

Sediment and water samples were collected in late 1992 and early 1993 by Blasland, Bouck and Lee (BBL) at Deposit A. The samples were analyzed for volatiles, semivolatiles, PCB Aroclor, pesticides, metals, and wet chemistry tests. Aroclor™ data was received during Stage 1 of the data management

process, the other analyses during Stage 2. These data represent 117 samples in the FRDB and accounts for 1,094 data records.

EcoChem, Inc. conducted a full data validation of these data in 1999 (Stage 2). The samples were analyzed by Hazleton Environmental Services, Inc. in Madison, Wisconsin. Analytical data were reviewed using quality control criteria documented in the analytical method, National Functional Guidelines, and the project QAPP. Validation was performed on volatile, semivolatile, PCB as Aroclor™, pesticide, and metals data. Accuracy and precision were generally acceptable. Qualifiers were assigned by EcoChem due to blank contamination, calibration outliers, secondary column confirmation precision outliers, laboratory control sample outliers, MS/MSD outliers, surrogate outliers, laboratory duplicate results, and graphite furnace post-digestion spike recovery results. Data, as qualified by EcoChem, are acceptable for use. The Data Validation Report is included as Appendix A of this report.

3.2.3 1993 Triad Assessment

The Triad data were collected by WDNR from several sites and analyzed in 1992 and 1993. The data were received from WDNR in 11 spreadsheet files (joint.wb2, orgpest.wb2, rtrben.wb2, tables.wb2, toxicity.wb2, triad92.wb2, triad92b.wb2, triad93.wb2, triaddat.wb2, triadhis.wb2, and foxriver.wq1) during Stage 1 data collection. All data were represented in files triad92b and triad93, and were redundant in the rest of the files. These spreadsheets contain polynuclear aromatic hydrocarbon (PAH), metals, Aroclor™, chlorinated pesticide, invertebrate, and benthos data. These data represent 27 samples and 631 analytical records in the FRDB. The original Triad data were modified to create unique sample IDs. A designation of "(Tr)" was appended to the existing sample IDs to ensure uniqueness. Data management occurred during Stage 1 of the data collection process.

Samples collected for the Triad Study were submitted to several different laboratories for physical and chemical characterization. These laboratories include University of Wisconsin-Extension's Soil and Plant Analysis (particle size and soil texture analyses); the State Laboratory of Hygiene (bulk sediment chemistry); and Hazleton Laboratory (PAHs collected in 1993). Quality control data were not available for review; however, full data validation on SLOH data could be conducted if requested. As these data have not undergone full validation, these data should be used as supporting data only.

3.2.4 1994 GAS/SAIC Sediment Data

The Graef, Anhalt, Schloemer & Associates/Science Application International Corporation (GAS/SAIC) data were collected during late 1994 for the Fox River Coalition. This data set includes sediment data collected at several deposits above the De Pere dam. Samples were analyzed for PCB Aroclors™, chlorinated pesticides, volatile organics, semivolatile organics, metals, and dioxins. These data were delivered by WDNR in six files (clp_data.xls, cnv_data.xls, dxn_data.xls, hg_data.xls, pcb_data.xls, and frgrnsiz.xls). The GAS/SAIC data set consists of 253 samples that comprise 5,654 records in the FRDB. Data management occurred during Stage 1 of the data collection process.

Approximately 20 percent of the GAS/SAIC data was fully validated by SAIC. The remainder of the data underwent a cursory review that excluded verification of compound identifications and raw data calculation checks. This evaluation followed specified methods described in the November 1994 *Final Report Sampling and Analysis Plan, Fox River Remedial Investigation*. The data validation reports do not specifically address chain of custody records associated with the samples.

In the process of reviewing the initial PCB and pesticide data reported by the initial laboratory involved, SAIC found incorrect PCB quantitations, inconsistent pesticide identifications, consistently poor surrogate recoveries, retention time shifts, and overall poor quality of work associated with the pesticides/PCB data. Based on EcoChem's review, these data should be used as supporting data only.

PCB-only analyses (from archived samples) and dioxin analyses were performed later by Analytical Resources, Inc. and Triangle Laboratories. In general, precision and accuracy for these analyses were judged acceptable by SAIC. PCB results were qualified as estimated by SAIC due to continuing calibration verification percent difference exceedances and poor surrogate recoveries. The dioxin results received minor qualifications due to blank contamination and elevated matrix spike recovery values. These data, as qualified by SAIC, are acceptable for use.

3.2.5 1995 WDNR Sediment Data

The 1995 sediment collection was conducted by WDNR and consists of sediment data collected from below the De Pere dam. Samples were analyzed for PCB Aroclors™ and metals. These data were provided by WDNR in eight files (corelocs.xls, convdata.xls, 95sedata.xls, metals.xls, metals2.xls,

pcbdata.xls, pcbdata2.xls, and sumdata.xls). The data set consists of 488 samples comprising 6,433 records. Data management occurred during Stage 1 of the data collection process.

Data validation was conducted by the M. A. Kuehl Company on approximately 20 percent of the 1995 De Pere data. The data validation reports were reviewed by EcoChem. Based on this evaluation, it was determined that the laboratory followed the specified methods described in the September 1995 *Quality Assurance Project Plan for Assessment of PCBs in Sediment of the Lower Fox River from De Pere to Green Bay*. Chain of custody records were reviewed, and they indicated that samples were received in good condition. These data, as qualified by M. A. Kuehl, are acceptable for use.

3.2.6 1996 FRG/BBL Sediment/Tissue Data

The 1996 BBL data set consists of 25 sediment and fish tissue samples collected for the Fox River Group (FRG). These samples were analyzed for PCB congeners and TOC. These data were provided by WDNR in six spreadsheet files (02771543.wq1, 02671543.wq1, 02571543.wq1, 03071543.wq1, 03171543.wq1, and 03271543.wq1) and comprise 2,771 records in the FRDB. Data management occurred during Stage 1 of the data collection process.

These data were validated by BBL to ensure that they met method quality control criteria and the project data quality objectives. No formal SAP or QAPP was issued prior to implementation of sample collection or analysis; however, BBL stated they used collection and analytical procedures that had been approved by U.S. EPA Region 5 for other projects. Samples were submitted to Inchcape Testing Services Laboratory of Vermont for chemical analysis. PCB results were not surrogate-corrected.

The memorandum written by BBL dated April 4, 1998, indicates that PCB and TOC data for sediment samples and PCB data for biota were reviewed. Chain of custody procedures were not documented by BBL in this *Data Quality Assessment Memorandum*. Qualifiers were applied to sediment and biota data because of quantitative confirmation differences, blank contamination, and surrogate and matrix spike outlier values. The data, as qualified by BBL, are acceptable for use.

3.2.7 1995–1996 WDNR Fish Tissue Data

The WDNR collected fish tissue samples along the length of the river in 1996. These data were provided by WDNR in a single, multiple-page spreadsheet

(all_fish.wb1). Samples were analyzed for PCB Aroclors™ and TOC. This data set comprises 1,673 records in the FRDB and consists of 200 samples. Data management occurred during Stage 1 of the data collection process.

Data validation was performed by the M. A. Kuehl Company on 20 fish tissue samples collected by the WDNR in 1996. The data validation report for SDG-1 was reviewed by EcoChem. This data validation was performed using the specified methods described in the April 1996 *Addendum to the Quality Assurance Project Plan for Assessment of PCBs in Sediment of the Lower Fox River from De Pere to Green Bay for PCB Analysis of Fish Tissue*. Chain of custody records were reviewed and they indicated that samples were received in good condition. Precision and accuracy were judged to be acceptable by the M. A. Kuehl Company. PCB results were qualified because they were detected above the MDL but below the PQL. The data, as qualified by the M. A. Kuehl Company, are acceptable for use.

3.2.8 1996–1999 USFWS NRDA Fish Tissue Data

As part of the Natural Resource Damage Assessment (NRDA) investigation, the U.S. Fish & Wildlife Service (USFWS) collected and analyzed 376 tissue samples in 1996. Samples were collected below De Pere and in Green Bay. The samples were analyzed for PCB congeners or PCB Aroclors™ and TOC. The USFWS NRDA data represents 16,017 records in the FRDB and was provided by the USFWS in a single file (pcbsecd.dbf.) Data management occurred during Stage 1 of the data collection process.

A full data validation was conducted by EcoChem on 376 tissue samples analyzed for the Green Bay NRDA project. This data validation was performed based on the specified method criteria described in the Battelle Laboratory SOP, *Identification and Quantitation of Polychlorinated Biphenyls (by Congener and Aroclor™) and Chlorinated Pesticides by Gas Chromatography/Electron Capture Detection*. Accuracy and precision were generally acceptable. Qualifiers were assigned by EcoChem due to blank contamination, continuing calibration verification percent difference outliers, blank spike results, surrogate outliers, laboratory duplicate results, reference material recovery results, and chromatographic interferences. Data, as qualified by EcoChem, are acceptable for use.

3.2.9 1997 USFWS NRDA Waterfowl Tissue Data, 1994–1995 Cormorant Data, and 1993 USFWS Tree Swallow Data

Results from waterfowl tissue sample analyses were provided by USFWS in two files (tcuster2.mdb and tcuster2.wpd). The samples were analyzed for chlorinated pesticides. This data set consists of 70 samples and 1,680 analytical data points.

Results from cormorant tissue sample analyses were provided by USFWS in two files (tcuster1.mdb and tcuster1.wpd). The samples were analyzed for PCB Aroclors™, chlorinated pesticides, and dioxins. This data set consists of 193 samples and 6,178 analytical data points.

Results from tree swallow tissue sample analyses were provided by the USFWS in two files (ccuster.mdb and ccuster.wpd). The samples were analyzed for PCB congeners, chlorinated pesticides, and dioxins. This data set consists of 200 samples and 5,429 analytical data points. Data management for all data types occurred during Stage 1 of the data collection process.

Three electronic text files were reviewed by EcoChem for data validation information regarding these data sets. Files reviewed include 1997 waterfowl data from Green Bay and Lake Michigan (tcuster1.wpd), 1994 through 1995 double-crested cormorants data from Green Bay (tcuster2.wpd), and Fox River and Green Bay 1993 through 1995 Tree Swallow Study (ccuster.wpd). Of these three documents, one (tcuster1.wpd) gives a brief synopsis of field sampling and chemical analysis procedures used to collect and analyze the samples. The information provided did not specifically address chain of custody records associated with the samples. No qualifiers were assigned based on this review although the statement "concentrations of PCB 118 may be overestimated because of coelution with PCB 106" may be considered a qualification. With regards to quality assurance and quality control approval, a reference is made to the Patuxent Analytical Control Facility (Patuxent) of USFWS, Laurel, Maryland. It is not clear from this statement if Patuxent established the quality control criteria, approved the method of analysis, or reviewed the results of the study. For these reasons the data should be used only as supporting data.

3.2.10 Fox River Fish Consumption Advisory Data

The initial fish contaminant data in the FRDB represents tissue samples collected by WDNR in the Fox River and Green Bay between 1971 and 1996 were addressed as part of the Stage 1 effort. These samples were analyzed for

PCB congeners, PCB Aroclors™, metals, chlorinated pesticides, and dioxins. The FRDB contains 1,766 samples from the fish contaminant study comprising 11,620 records. This data set is primarily tissue data with a small number of sediment samples. Data management occurred during Stage 1 of the data collection process. A second delivery of 1998 fish contaminant data (tissue) was received during Stage 2 data collection. These data represent 130 samples and 777 data records in the FRDB and was conducted during Stage 2 of the data management process.

In 1995, the M. A. Kuehl Company conducted a laboratory audit at the Wisconsin SLOH. The purpose of this audit was to assess the laboratory capability to analyze tissue and sediment samples for PCB, TOC, and metals. Although she made a few observations and had a few findings, Ms. Kuehl found the laboratory to be capable of performing the requested analyses. The Wisconsin SLOH was also visited by EcoChem personnel, and analysts and managers were interviewed. Sample handling, preparation, and analysis systems were reviewed. In-depth discussions occurred concerning peak identification and quantitation. All hardcopy and electronic data are available, and could be fully validated if requested. As these data have not undergone full validation, these data should be used as supporting data only. Refer to Section 2.2.1 for further discussion of data generated by SLOH and refer to 2.2.18 for a discussion of the review of more recent data generated by SLOH.

3.2.11 WDNR Wildlife Tissue Data

This data set is a collection of wildlife tissue sample data collected by WDNR during the time period from 1984 to 1996 and collated in three files (all.db, geese.db, and ducks.db). The data set represents bird and mammal tissue samples analyzed for chlorinated pesticides. This data set contains 417 samples and 2,532 analytical data points. Data management occurred during Stage 1 of the data collection process.

Quality control information was not available, therefore these data should be used as supporting data only.

3.2.12 Lake Michigan Tributary Monitoring Data

The Lake Michigan Tributary Monitoring samples from the Fox River were collected by the U.S. Geological Survey (USGS) in support of the Lake Michigan Mass Balance Study, administered by the U.S. EPA's GLNPO. These water samples were analyzed for PCB congeners, chlorinated pesticides, and mercury. This data set consists of 88 samples and 5,722 analytical data points. Data management occurred during Stage 1 of the data collection process.

These data were validated by the M. A. Kuehl Company, and these data are considered useable, as qualified.

3.2.13 Stromberg Eagle Data

Eagle samples were collected for the USFWS under the direction of Ken Stromberg between 1991 and 1996. The data were provided by the USFWS in a text file report (strmbrg.wpd) and required manual extraction point by point. The samples were analyzed for PCB congeners, chlorinated pesticides, and dioxins. This data set contains 31 samples and 954 analytical data points. Data management occurred during Stage 1 of the data collection process.

Quality control information was not available, therefore these data should be used as supporting data only.

3.2.14 USGS NAWQA Data

The National Ambient Water Quality Assessment Program (NAWQA) data represent samples collected by the USGS between 1992 and 1997. There are 441 samples of sediment, water, and tissue. These samples were analyzed for an extensive list of chlorinated pesticides and herbicides, organophosphorus pesticides, semivolatile, and metallic analytes. These data were provided by the USGS in 21 files with additional information obtained on the NAWQA website. These sample analyses represent 11,879 records in the FRDB, approximately 90 percent of which is from waterways other that the Fox River and is noted as "reference." Data management occurred during Stage 1 of the data collection process.

Of the 441 environmental samples collected between 1992 and 1997, approximately 15 percent were quality control samples collected concurrently during field sampling activities. Types of quality control samples collected include field blanks and trip blanks for surface water and groundwater matrices, and field replicates and splits for all matrices. Surface water and groundwater samples were spiked to assess precision and accuracy of the volatile and pesticide methods. Surrogates were added to all environmental samples undergoing pesticide, volatile, and other trace organic analyses.

The results of the quality control samples were reviewed by the USGS NAWQA group and were reported in the USGS Water-Resources Investigations Report 97-4148, *Results of Quality-Control Sampling of Water, Bed Sediment, and Tissue in the Western Lake Michigan Drainages Study Unit of the National Water-Quality Assessment Program*. All results were found to be

acceptable by NAWQA. Accuracy was generally acceptable, as demonstrated by the percent recovery values of the surrogate and matrix spike values. Precision was generally acceptable, as demonstrated by the relative percent difference values of the sample duplicates. While thorough investigations, and in some cases corrective actions, were performed to explain quality control anomalies (e.g., blank contamination, occasional poor spike recovery values, and possible interferences causing bias), no qualifiers were applied directly to the analytical results. In summary, the data user should refer to this report when using these data to gain a complete understanding of its limitations. As the content of the data packages is not known, the data may or may not be amenable to independent validation. For the reasons mentioned above, the NAWQA data should be used as supporting data only.

3.2.15 1994 Woodward-Clyde Deposit A Sediment Data

Sediment samples were collected by Woodward-Clyde in 1994 at Deposit A. These samples were analyzed for PCB Aroclors™ and TOC. They were provided by WDNR in 12 files, only one of which contained analytical data (pcb_to~1.xls). This data set contains 66 samples and represents 585 records in the FRDB. Data management occurred during Stage 1 of the data collection process.

A limited data validation was conducted by EcoChem (September 1998) on these data for the Little Lake Butte des Morts (LLBdM) Deposit A project. This data validation was performed using the specified methods described in the August 1994 *Quality Assurance Project Plan (QAPP) for the Pre-Design Study on Little Lake Butte des Morts*. It should be noted that the specific procedures to be used for data validation (Sections 2 and 9 of the QAPP) were slightly modified to account for differences in laboratory deliverables. For instance, holding times could not be assessed since chain of custody forms were not provided and a case narrative describing any deviations from proposed analysis was not provided. Accuracy was generally acceptable, as demonstrated by the percent recovery values of the surrogate, and matrix/blank spikes. Precision was generally acceptable, as demonstrated by the relative percent difference values of the sample and laboratory duplicates. Qualifiers were assigned by EcoChem due to poor matrix spike recovery values. Based on this limited review, all data, as qualified by EcoChem, are acceptable for use.

3.2.16 WPDES Permit Influent Data

Influent water samples along the Fox River were collected by various entities (commercial and governmental) as part of the Wisconsin Pollutant Discharge Elimination System (WPDES) regulatory program, then analyzed for various

fractions by WDNR-certified laboratories. These data were provided by WDNR in a spreadsheet and consist of samples collected in 1993 and 1997. These data do not adhere to a regular sampling schedule and were provided as supplemental water quality data. These data do not have associated QA/QC data, as the samples were not collected for an RI/FS-type activity. This data set consisted of eight samples and 847 records. Data management occurred during Stage 1 of the data collection process.

As QC information was not available, these data should be used only as supporting data.

3.2.17 Lower Fox River Background Metals Assessment

These data were collected from 1991 to 1993 and consist of 14 samples and 78 records in the FRDB. Data management occurred during Stage 1 of the data collection process.

Raw data and accompanying quality control information were not available for review. The data should be used only as supporting data.

3.2.18 1997 WDNR Caged Fish Bioaccumulation Study Data

WDNR placed caged fish near the demonstration projects conducted at Deposit N and SMU 56/57 prior to the initiation of the projects. The fish and collocated sediment samples were collected and analyzed for PCB congeners by the Wisconsin SLOH (for more discussion of SLOH, see Section 2.2.1). This data set consists of 25 samples and 1,672 records in the FRDB. Data management occurred during Stage 1 of the data collection process.

At the request of WDNR, select sediment and fish tissue data from this study were reviewed to show the quality of the older data (e.g., Green Bay Mass Balance) was consistent with that of the new data sets. The data packages from the laboratory consisted of strip charts containing the chromatograms and associated instrument printouts of the standards, QC sample results, and field sample results. Data packages summarizing calibration and other ancillary QC results (as provided under the EPA Contract Laboratory Program) were not available from the laboratory. The samples were analyzed using the protocol outlined in the *Quality Assurance Plan* (QAP), *Green Bay Mass Balance Study* (March 11, 1988). The data were reviewed using the criteria listed in the QAP and the *U.S. EPA National Functional Guidelines for Organic Data Review* (February 1994).

Overall, these sets of data met the QC criteria as specified in the QAP. Although not assigned in this review, qualifiers could be assigned due to surrogate and matrix spike outliers indicating the potential for high bias. It is unlikely that any data would be rejected.

As determined by this review, these data should be used as supporting data. Refer to Sections 2.2.1 and 2.2.10 for further discussion of data generated by SLOH.

3.2.19 1997 Demonstration Project Data – Deposit N

Sediment, water, and wipe samples were collected by Foth & Van Dyke from Deposit N. The environmental samples were analyzed for PCB Aroclors™, mercury, and TOC. This data set contains 10 samples and represents 83 records in the FRDB. Data management occurred during Stage 2 of the data collection process.

Full data validation was conducted by the M. A. Kuehl Company on approximately 10 percent of the 1997 Fox River Deposit N data (PCBs and mercury). A limited data review was conducted on the remainder of the data (PCBs, mercury, and TOC). Results of this evaluation indicate that the laboratory followed the specified methods described in the October 1997 *Fox River Deposit N Removal Project Pre-Design Phase Quality Assurance Project Plan*. Chain of custody documentation, although not referred to directly by M. A. Kuehl's December 26, 1997 *Technical Memorandum - Data Validation for Fox River Deposit N*, was acceptable (report mentions discrepancies only). PCB data were qualified due to holding time exceedances and poor matrix spike recovery. No qualifiers were assigned to the TOC and mercury data. Matrix spike and lab duplicates were not performed on water samples submitted for PCB analysis due to insufficient sample volumes. No action was taken because the laboratory performed alternative QC measures (control spikes) with acceptable recoveries. The data, as qualified by M. A. Kuehl, are acceptable for use.

3.2.20 1997–1998 Demonstration Project Data – SMU 56/57

Sediment samples were collected in late 1997 and early 1998. Montgomery Watson and Harrington Engineering & Construction implemented a sediment removal demonstration project at SMU 56/57 on behalf of the WDNR. The environmental samples were analyzed for a full suite of parameters that included PCB Aroclors™, mercury, and TOC. This data set contains 295 samples and represents 3,114 records in the FRDB. Data management occurred during Stage 2 of the data collection process.

Data validation was performed by Montgomery Watson on over 100 analytical batches of data collected at SMU 56/57 in 1997 and 1998. Full data validation was performed on sediment PCB and mercury data and a limited data review was conducted on all other analytical parameters. The full data validation and limited review were performed using the specified methods described in the *Field Sampling Plan Pre-Design Investigation Sediment Management Unit 56/57 Sediment Removal Demonstration Project* and accompanying *Quality Assurance Project Plan* (May 1998) and *U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Analysis Review* (February 1994). Chain of custody documentation was not covered in the data validation or the review. Precision and accuracy were judged to be acceptable by Montgomery Watson. PCB results were qualified as estimated by Montgomery Watson because PCBs were analyzed beyond holding times. Mercury results were qualified as estimated because matrix spike percent recovery values exceeded the control limit criteria. Results from other analytical methods were qualified for holding time exceedances (total Kjeldahl nitrogen results) and blank contamination (variety of conventionals analyses). Only the QC elements for the PCB and mercury sediment results were summarized in Table 3-2 due to the number of analytical tests performed on the effluent samples. Based on Montgomery Watson's limited review, the data are considered usable.

3.2.21 1998 RETEC RI/FS Supplemental Data

Supplemental sediment samples were collected from the Lower Fox River in June of 1998 by Remediation Technologies, Inc. (RETEC) for the WDNR. Samples were collected according to procedures outlined in the *Sampling and Analysis Plan and Quality Assurance Project Plan for Supplemental Data Collection, Fox River RI/FS*. This data set consists of 252 samples and 10,781 records in the FRDB. Data management occurred during Stage 1 of the data collection process.

A full data validation was conducted by EcoChem, Inc. (1998). Analytical data were reviewed using quality control criteria documented in the analytical method, National Functional Guidelines, and the project QAPP. Validation was performed on PCB, semivolatile, pesticide, metals, and conventional (TOC and total solids) data packages. Accuracy and precision were generally acceptable. Qualifiers were assigned by EcoChem due to holding time exceedances, blank contamination, continuing calibration verification percent difference outliers, lack of secondary column confirmation, blank and matrix spike outliers, surrogate outliers, laboratory duplicate results, and reference material recovery results. Data, as qualified by EcoChem, are acceptable for use.

3.2.22 Lake Michigan Mass Balance Data

The Lake Michigan Mass Balance samples were collected in 1994 and 1995. Sediment, water, tissue, and air samples were collected and were analyzed for PCB congeners, volatiles, pesticides/herbicides, metals, and wet chemistry tests. Electronic data were received on compact disc (CD) for 21 focus groups. This data set contains 6,987 samples and represents 91,621 records in the FRDB. Data management occurred during Stage 2 of the data collection process.

EcoChem, Inc. performed a review of the Lake Michigan Mass Balance (LMMB) Study QA program and assessed the quality of the data generated for the study. This evaluation of the quality assurance program included a review of the measurement quality objectives (MQOs), the *Lake Michigan Mass Balance (LMMB) Study QA and Data Management Workgroups Peer Review Meeting Briefing Book* (April 29–30, 1999), and the *Lake Michigan Mass Budget/Mass Balance Work Plan* (October 14, 1993). To clarify the QA process followed in this study, telephone interviews with several LMMB Study participants were conducted. Third-party review of the data was not performed, nor were raw data available for this review. Thus, the quality of the data was judged on the assumption that the QA program and the MQOs were met. Although the data were not reviewed by an independent third-party, sufficient information was available about the QA program to render a judgment on the probable usability of the data. The samples were analyzed for PCB congeners, pesticides, metals, atrazine, nutrients, conventionals, various biological measurements, lead 210 and cesium 137.

The samples were analyzed by reputable commercial and academic/research laboratories that were audited prior to sample analysis and again during sample analysis by the program QA personnel and by the U.S. EPA. The MQOs that were followed by the academic/research laboratories were different than those employed under the U.S. EPA Contract Laboratory Program (CLP); the U.S. EPA *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition* (as updated); or the *U.S. EPA National Functional Guidelines* (NFG) *for Organic Data Review* (February 1994) and *U.S. EPA National Functional Guidelines for Inorganic Data Review* (February 1994). For instance, the acceptability of the initial calibration, as specified by NFG, is measured by a correlation coefficient (r). The correlation coefficient must be greater than or equal to 0.995 (or $r^2 \geq 0.990$). For the congener analyses of the samples in this study, the criterion for several laboratories was that r^2 must be greater than or equal to 0.95. The criteria for this study used by each laboratory were approved by the U.S. EPA. However, because the QC criteria are different

from NFG, the precision and accuracy may differ from that of the data sets collected using NFG. Because of this, the data should be considered as supporting data only. Although it is likely that some data would be estimated if the data were reviewed by an independent third party using the U.S. EPA NFG criteria, it is unlikely that any data would be rejected.

3.2.23 Minergy Mineralogical Data

The Minergy data are comprised of results from the analysis of 15 sediment samples for 11 different mineral oxides, sulfur, chloride, and two different loss on ignition (LOI) procedures. Two hundred nineteen (219) analytical records were generated. Data management occurred during Stage 2 of the data collection process. The Mineral Lab analyzed the samples for mineral oxides, sulfur, and chloride. Badger Laboratories & Engineering performed the loss on ignition procedure.

EcoChem, Inc. performed a review of the Minergy site data generated for the study. The evaluation of the quality control elements with these analyses included telephone interviews with personnel at each laboratory. Third-party review of the data was not performed, nor were raw data available for this review. Thus, the quality of the data was judged solely on the information obtained during the telephone interviews. Although the data were not reviewed by an independent third party, sufficient information was available about the QA program to render a judgment on the probable usability of the data.

Based on the information received during the telephone interview with Badger Laboratories and Engineering, the LOI data are usable as reported.

Based on the information received during the telephone interview with The Mineral Lab, the mineral oxide, sulfur, and chloride data should be considered as estimated. The data users should be aware that these data may be potentially biased. The mineral oxide, sulfur, and chloride data should be considered as supporting data only; it is unlikely that any data would be rejected during a full validation.

3.2.24 1998 FRG/Exponent Data

Exponent collected tissue samples in the summer of 1998 for the Fox River Group (FRG). Samples were collected from Little Lake Butte des Morts to Green Bay Zone 3 and were analyzed for PCB congeners and PCB Aroclors™, pesticides/herbicides, metals, and wet chemistry tests. The data set contains

225 samples that account for 17,708 records in the FRDB. Data management occurred during Stage 2 of the data collection process.

EcoChem performed a review of the FRG 1998 data validation reports authored by Exponent, Inc. EcoChem evaluated the validation reports for completeness and technical agreement. To clarify some of the findings, raw data were reviewed. The samples were analyzed by U.S. EPA SW-846 methodology and other miscellaneous EPA methods. The data were validated by BBL using the *U.S. EPA National Functional Guidelines for Organic Data Review* (February 1994); *U.S. EPA National Functional Guidelines for Inorganic Data Review* (February 1994), and *Lower Fox River System NRDA Quality Assurance Project Plan* (December 1998).

Overall, the data are of acceptable quality. The samples were analyzed and validated as specified in the QAPP. A more detailed review of the data would result in additional qualifiers being assigned. As determined by this review, the data, as qualified, are usable for the intended purpose.

3.2.25 1998 FRG/BBL Sediment/Tissue Data

BBL collected tissue, sediment and water samples in 1998 for the FRG. Samples were analyzed for semivolatiles, PCB congeners and PCB Aroclors™, pesticides/herbicides, radchem, metals, and wet chemistry tests. The data set contains 1,315 samples that account for 18,824 records in the FRDB. Data management occurred during Stage 2 of the data collection process.

EcoChem performed a review of the FRG 1998 data validation reports authored by BBL. EcoChem evaluated the validation reports for completeness and technical agreement. To clarify some of the findings, raw data were reviewed. The samples were analyzed by U.S. EPA SW-846 methodology and other miscellaneous EPA methods. The data were validated by BBL using the *U.S. EPA National Functional Guidelines for Organic Data Review* (February 1994), *U.S. EPA National Functional Guidelines for Inorganic Data Review* (February 1994), and *Lower Fox River System NRDA Quality Assurance Project Plan* (December 1998).

Overall, the data are of acceptable quality. The samples were analyzed and validated as specified in the QAPP. In some cases, criteria from NFG, rather than the analytical method criteria, were used to evaluate the data. A more detailed review of the data would result in additional qualifiers being assigned. It is unlikely that any more data would be rejected. As determined by this review, the data, as qualified, are usable for the intended purpose.

3.2.26 1998–1999 Deposit N Data: Remediation/Pre-Dredge/Post-Dredge/Operational Monitoring

Data for the Deposit N pilot remediation project was received in four sections: pre-dredge data, post-dredge data, operational monitoring data, and sediment remediation (environmental monitoring) data. Collectively, sediment, tissue, and water samples were collected and analyzed for PCB Aroclors™, PCB congeners, metals, and wet chemistry tests. The Deposit N pilot remediation data represents 305 samples and accounts for 12,514 records in the FRDB. Data management occurred during Stage 2 of the data collection process.

EcoChem performed a review of the data validation reports authored by the M. A. Kuehl Company. EcoChem evaluated the validation reports for completeness and technical agreement. To clarify some of the findings, raw data were reviewed.

The samples were analyzed by U.S. EPA SW-846 methodology. The data were validated using the Region 5 Modifications to *U.S. EPA National Functional Guidelines for Organic Data Review* (February 1994), *U.S. EPA National Functional Guidelines for Inorganic Data Review* (February 1994), and the *Fox River Group Deposit N Demonstration Project Quality Assurance Project Plan* (1998).

Overall, the data are of acceptable quality. The samples were analyzed and validated as specified in the QAPP. A more detailed review of the data would result in additional qualifiers being assigned in some cases and qualifiers being removed in others. It is unlikely that any more data would be rejected. As determined by this review, the data, as qualified, are usable for the intended purpose.

3.2.27 Ankley and Call Data

EcoChem conducted a data entry process on data presented in the *Sediment Quality Evaluation in the Lower Fox River and Southern Green Bay of Lake Michigan Report*. A second party verified the data entry. These data represent 62 individual samples and comprises 1,607 records in the FRDB. Data management occurred during Stage 2 of the data collection process.

EcoChem did not conduct any data quality assessment on these data. The quality of the data is therefore indeterminate.

3.2.28 State of Michigan Fish Consumption Advisory Data

The State of Michigan Fish Consumption Advisory data included in the FRDB are the results of fish tissue samples collected between 1983 and 1999. The samples were from Green Bay zones 3A and 4, as well as from tributaries flowing into Green Bay. The samples were analyzed for PCB Aroclors™, pesticides/herbicides, dioxins, metals, and wet chemistry tests. The data represents 434 samples and accounts for 6,979 records in the FRDB. Data management occurred during Stage 2 of the data collection process.

At the request of the WDNR, EcoChem performed a review of the FRG 1998 data validation reports authored by Exponent, Inc. See Table 3-1 for a listing of reports and samples. EcoChem was to evaluate the validation reports for completeness and technical agreement. To clarify some of the findings, raw data were reviewed.

The samples were analyzed by U.S. EPA SW-846 methodology and other miscellaneous EPA methods. The data were validated by BBL using the *U.S. EPA National Functional Guidelines for Organic Data Review* (February 1994), *U.S. EPA National Functional Guidelines for Inorganic Data Review* (February 1994), and *Lower Fox River System NRDA Quality Assurance Project Plan* (December 1998).

Overall, the data are of acceptable quality. The samples were analyzed and validated as specified in the QAPP. A more detailed review of the data would result in additional qualifiers being assigned.

As determined by this review, the data are usable for the intended purpose.

3.2.29 1999 Demonstration Project Data – SMU 56/57

These data are in the process of being appended to the database.

At the request of the WDNR, EcoChem performed a review of the FRG data validation reports for the 1999 SMU 56/57 and Deposit N demonstration projects authored by the M. A. Kuehl Company.

The samples were analyzed according to U.S. EPA SW-846 methodology. The data were validated using *U.S. EPA Region 5 Standard Operating Procedure for Validation of CLP Organic Data* (February 1997), *U.S. EPA National Functional Guidelines for Organic Data Review* (February 1994), *U.S. EPA National Functional Guidelines for Inorganic Data Review* (February 1994), *Draft Quality Assurance Project Plan Environmental Monitoring of SMU 56/57 Demonstration*

Project – Mass Balance Approach, Revision I (August 1999), and the *Draft Quality Assurance Project Plan Monitoring of Deposit N Demonstration Project – Mass Balance Approach* (December 1998).

Overall, the data are of acceptable quality. The samples were analyzed and validated as specified in the QAPP. A more detailed review of the data would result in additional qualifiers being assigned in some cases. It is unlikely that any more data would be rejected. As determined by this review, the data are usable for the intended purpose. No further review is recommended at this time.

3.3 Data Usability

3.3.1 Fully Validated Data

The following data sets have been validated by an independent party and are considered useable, as qualified:

- 1994 GAS/SAIC Sediment Data;
- 1994 Woodward-Clyde Deposit A Sediment Data;
- 1995 WDNR Sediment Data;
- 1996–1999 USFWS NRDA Fish Tissue Data;
- 1995–1996 WDNR Fish Tissue Data;
- 1997–1998 Demonstration Project Data – SMU 56/57;
- 1998 RETEC RI/FS Supplemental Data;
- 1996 FRG/BBL Sediment/Tissue Data;
- 1997 Demonstration Project Data – Deposit N;
- 1992–1993 BBL Deposit A Sediment Data;
- 1998 FRG/Exponent Data;
- 1998 FRG/BBL Sediment/Tissue Data;

- 1998–1999 Deposit N Data: Remediation/Pre-Dredge/Post-Dredge/Operational Monitoring;
- 1999 Demonstration Project Data – SMU 56/57;
- State of Michigan Fish Consumption Advisory Data; and
- Lake Michigan Tributary Monitoring Data.

Although the data sets (listed above) were found to be validated and useable, it must be stressed that there were individual data points that were rejected. These rejected data points have not been used in support of the RI/FS or RA.

3.3.2 Supporting Data

The following data sets have not been validated and, in general, should be used only as supporting data. The data have been collected within different programs and with different data quality objectives therefore, varying degrees of supporting documentation may be available.

- 1989–1990 Fox River Mass Balance Study,
- 1989–1990 Green Bay Mass Balance Study (GLNPO),
- 1993 Triad Assessment,
- 1993 USFWS Tree Swallow Data,
- 1994–1995 Cormorant Data,
- 1997 USFWS NRDA Waterfowl Tissue Data,
- 1997 WDNR Caged Fish Bioaccumulation Study Data,
- Fox River Fish Consumption Advisory Data,
- Stromberg Eagle Data,
- USGS NAWQA Data,
- WDNR Wildlife Tissue Data,
- WPDES Permit Influent Data,
- Lake Michigan Mass Balance Data,
- Minergy Mineralogical Data, and
- Lower Fox River Background Metals Assessment.

3.3.3 Indeterminate Data

The following data sets have not been validated and have not been subjected to a data quality review. This is due to complete lack of supporting QA/QC documentation; or, the hardcopy data and documents were not received by

EcoChem by the date of this report. At this time, the overall quality of these data sets is unknown and the data should be used with that fact in mind.

- Ankley and Call Data

Table 3-1 Data Set Analysis

Data Source	Number of Samples	Matrices[1]	Analyses Conducted[2]	Number of Records	Number of Files in Delivery	File Type	Report Section	Earliest Year of Collection	Latest Year of Collection
1989–1990 Fox River Mass Balance Study	1,967	S, W	PCB-A, PCB-C, W	25,457	6	Spreadsheet	2.2.01	1989	1990
1989–1990 Green Bay Mass Balance Study (GLNPO)	2,069	S, T, W	B, PCB-C, W	201,701	92	Database	2.2.01	1987	1990
1992–1993 BBL Deposit A Sediment Data	117	S, W	M, P/H, PCB-A, SVOA, V, W	1,094	1	Spreadsheet	2.2.02	1992	1993
1993 Triad Assessment	27	S	B, M, P/H, PCB-A, SVOA, W	631	11	Spreadsheet	2.2.03	1992	1993
1993 USFWS Tree Swallow Data	200	T	B, DXN, P/H, V, W	5,429	2	Database	2.2.09	1993	1993
1994 GAS/SAIC Sediment Data	253	S	DXN, M, P/H, PCB-A, SVOA, V, W	5,654	6	Spreadsheet	2.2.04	1994	1994
1994 Woodward-Clyde Deposit A Sediment Data	66	S	PCB-A, W	585	12	Spreadsheet	2.2.15	1994	1994
1994–1995 Cormorant Data	193	T	B, DXN, P/H, PCB-C, W	6,178	2	Database	2.2.09	1994	1995
1995 WDNR Sediment Data	488	S	M, PCB-A, W	6,433	8	Spreadsheet	2.2.05	1995	1995
1996 FRG/BBL Sediment/Tissue Data	25	S, T	B, PCB-C, W	2,771	6	Spreadsheet	2.2.06	1996	1996
1995–1996 WDNR Fish Tissue Data	200	T	B, PCB-A, W	1,673	1	Spreadsheet	2.2.07	1995	1996
1997 Demonstration Project Data - Deposit N	10	S	M, PCB, W	83	1	Spreadsheet	2.2.19	1997	1997
1997–1998 Demonstration Project Data - SMU 56/57	295	S, W	DXN, M, P/H, PCB-A, SVOA, V, W	3,114	12	Spreadsheet	2.2.20	1997	1998
1997 USFWS NRDA Waterfowl Tissue Data	70	T	B, P/H, PCB, V, W	1,680	2	Database	2.2.09	1997	1997
1997 WDNR Caged Fish Bioaccumulation Study Data	25	S, T	B, PCB-C, W	1,672	2	Spreadsheet	2.2.18	1997	1997
1998 FRG/BBL Sediment/Tissue Data	1,315	S, T, W	B, M, P/H, PCB-A, PCB-C, RAD, SVOA, W	18,824	1	Database	2.2.25	1998	1998
1998–1999 Deposit N Data: Post-Dredge	43	S	PCB-A, PCB-C, W	690	8	Spreadsheet	2.2.26	1999	1999
1998–1999 Deposit N Data: Pre-Dredge	53	S	PCB-A, PCB-C, W	1,437	6	Spreadsheet	2.2.26	1998	1998
1998 FRG/Exponent Data	225	T	B, M, P/H, PCB-A, PCB-C, W	17,708	3	Database	2.2.24	1998	1998
1998 RETEC RI/FS Supplemental Data	252	S, T	B, DXN, M, P/H, PCB-A, PCB-C, SVOA, V, W	10,781	1	ASCII	2.2.21	1998	1998
Fox River Fish Consumption Advisory Data: 1998 WDNR Fish Consumption Data	130	T	B, M, PCB-A, W	777	1	ASCII	2.2.10	1998	1998
1998–1999 Deposit N Data: Remediation Data	197	T, W	PCB-C, W	10,264	1	Spreadsheet	2.2.26	1998	1999
Ankley and Call Data	62	PW, S, T, W	DXN, M, P/H, PCB, SVOA, W	1,607	0	Hardcopy	2.2.27	1989	1989
1998–1999 Deposit N Data: Operational Monitoring Data	12	S	M, PCB-A, W	123	1	Spreadsheet	2.2.26	1998	1998
Fox River Fish Consumption Advisory Data	1,766	S, T	B, DXN, M, P/H, PCB-A, PCB-C, SVOA, V, W	11,620	2	ASCII	2.2.10	1971	1996
State of Michigan Fish Consumption Advisory Data	434	T	B, DXN, M, P/H, PCB-A, W	6,979	1	Database	2.2.28	1983	1999
Lake Michigan Mass Balance Data	6,987	A, S, T, W	M, P/H, PCB-C, V, W	91,621	211	Database	2.2.22	1993	1996
Lake Michigan Tributary Monitoring Data	88	W	M, P/H, PCB-C, V	5,722	5	Spreadsheet	2.2.12	1994	1995
Lower Fox River Background Metals Assessment	14	W	M	78	1	Spreadsheet	2.2.17	1991	1993
Minergy Mineralogical Data	15	S	W	219	1	Spreadsheet	2.2.23	1995	1999
Stromberg Eagle Data	31	T	B, DXN, P/H, PCB-A, PCB-C, SVOA, V, W	954	1	ASCII	2.2.13	1991	1996
1996–1999 USFWS NRDA Fish Tissue Data	376	T	DXN, P/H, PCB-A, PCB-C, W	16,017	5	Spreadsheet	2.2.08	1996	1999
USGS NAWQA Data	441	S, T, W	B, M, P/H, PCB, SVOA, V, W	11,879	21	Spreadsheet	2.2.14	1992	1997
WDNR Wildlife Tissue Data	417	T	B, M, P/H, PCB-A	2,532	3	Database	2.2.11	1984	1996
WPDES Permit Influent Data	8	W	B, DXN, M, P/H, PCB-A, RAD, SVOA, V, W	847	1	Spreadsheet	2.2.16	1993	1997
Total: 35 Data Sets	**18,871**			**474,834**	**438**				

[1] Matrices:

A - Ambient Air
PW - Sediment Pore Water
S - Sediment
T - Tissue
W - Water

[2] Analyses:

B - Biological
DXN - Dioxins
M - Metals
PCB - Total PCBs only
PCB-A - PCB Aroclor
PCB-C - PCB Congener
P/H - Pesticides/Herbicides
SVOA - Semivolatiles
V - Volatiles
W - Wet Chemistry (including all physical and conventional data)

Table 3-2 QC Elements for Data Sets Supporting the Fox River RI/FS and RA

Parameters: Requirements	1989–1990 Green Bay Mass Balance Study (GLNPO)	1995–1996 WDNR Fish Tissue Data	1996 USFWS/ Hagler Bailly Data	1995 WDNR Sediment Data		
	PCBs Sediment	PCB Fish Tissue	PCB Fish Tissue	PCBs Sediment	TOC Sediment	Metals Sediment
SDG #s	University of Minnesota - Data groups: IN0042, IN0047, IN0052, IN0057, IN0061, IN0070, IN0076, IN0078, IN0037, and IN0041	SLOH Fish SDG-1	Battelle Laboratory Multiple SDGs	Hazleton SDG #s TBD2, 10, 1 & 20	Hazleton SDG #s TBD2, 10, 1 & 20	Hazleton SDG #s TBD2 & 20
Data Review 1) Third-party Validation Performed	Verification Only Deborah Swackhamer, Ph.D.	M. A. Kuehl Co.	EcoChem	Y - M. A. Kuehl	Y - M. A. Kuehl	Y - M. A. Kuehl
Deliverables 1) Electronic Deliverables	Y	Y	Y	Y	Y	Y
2) Hardcopy	Some - Not sure if this is a complete set	Y	Y	Some	Some	Some
Data Review Details 1) Package Completeness	Not determined	Y	Y	Y	Y	Y
2) Chain of Custody Procedures	Not determined	Not determined	Y - Minor issues	Not determined	Not determined	Not determined
3) Holding Times	Not summarized on the QA/QC Summary Report Sheet	Y	Y	Y	Y	Y
4) Initial Calibration	Not summarized on the QA/QC Summary Report Sheet	Y (25%)	Y (35%)	25%	Y	Y
Curve (# of standards)	Not summarized on the QA/QC Summary Report Sheet	5 pt	5 pt	5 pt	Daily 1 pt	1 pt/6 pt for Hg
5) Calibration Verification	Not summarized on the QA/QC Summary Report Sheet	15 %D	Varies between GC/ECD & GC/MS, <25% for 75% analytes	15%	20%	10% for metals & 20% for Hg
Secondary Column	Not summarized on the QA/QC Summary Report Sheet	25 %D	Y - Data not used	25 %D for CC on 2nd column	NA	NA
6) Laboratory Blanks	Not clear	Y	Y	Y	Y	Y
7) Surrogate Recoveries (# required)	Y - 50%–120%	Y - 70%–120%	Y - 50%–125%	60%–150%	NA	NA
8) Matrix Spike (# required)	Y - 50%–120%	Y - 65%–125%	Y - 50%–125% tri- & deca- 30%–125% for mono- & dichloro-	65%–125%	75%–125%	75%–125%
9) Lab Duplicate	Y - Not clear what limits are	Y - 26% limit	Y - 50%	26%	20%	20%
Lab Control Sample (SRM results?)	None/QAPP says that series of blindly-coded QA samples will be analyzed	N	SRM NRC %D Carp-1 <35%	NA	NA	Y - EPA
10) Gel Permeation/Forisil Cleanup	Not provided	Y	Not mentioned	Y	NA	NA
11) Detection Limit	Not provided	50 µg/kg	Results reported to 0	50 ppb	NA	CRDL
12) Calc and Transposition Verification (Qualitative verification?)	Not able to determine if this was done	Y - Recalc.	Y - Recalc. & verification	Y - Recalc. performed >10% frequency	NA	10%
13) Field QC Results	Not apparent	NA	None	None	None	None
14) Usability Usable/ Supporting	Y	Usable	Usable	Usable	Usable	Usable
Qualifiers	Qualifiers mentioned but not defined	Y - Minor J quals due to detections below PQL	Y - Quals due to CCV %D outliers, BS results, surr. outliers, lab dups., SRM results & inteferences	Y - Minor J flags due to low surr. recovery or below PQL and above MDL	Y - Minor J flags due to poor lab RPD	None
15) Other IC Samples	NA NA			NA	NA	20%
SAP	N - Study Plan		N	Y		
QAPP	Y		Y - Tech Memo	Y		
Lab QAM	Answer Pending/U of M SOPs?	Y	Y - Tech Memo	Y - Hazleton SOPs		

Table 3-2 QC Elements for Data Sets Supporting the Fox River RI/FS and RA

Parameters: Requirements	Lake Michigan Mass Balance Data	1998 Fox River NRDA				
	Asst. Convs., Pest/PCB, Hg, Atrazine, DEA, DIA Water (open lake, tributary), Air, Sediment, Phytoplankton	PCB Fish Tissue	PCB Congener Fish Tissue	PCB Congener Fish Tissue	Pesticide Fish Tissue	Mercury Fish Tissue
SDG #s	BALN, GPLN, GRAN, GRLN, IUAA, IUAP, LHTL, LHTM, LHTN, LHTP, MDLH, MIAH, MNPH, RUAP, RULA, RUTA, SSSP, USTN, WSAA, WWTH, WWTN	Enchem Multiple SDGs	Michigan State University	Quanterra	Enchem Multiple SDGs	Enchem Multiple SDGs
Data Review 1) Third-party Validation Performed	N - Data reviewed by QC Coordinators	Exponent	Exponent	Exponent	Exponent	Exponent
Deliverables 1) Electronic Deliverables	Y	Y	Y	Y	Y	Y
2) Hardcopy	Unknown	Y	Y	Y	Y	Y
Data Review Details 1) Package Completeness	Not addressed	Y	Y	Y	Y	Y
2) Chain of Custody Procedures	Not addressed	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
3) Holding Times	No DV reports provided	Y	Some exceedances samples J/UJ	Y	Some exceedances samples J/UJ	Y
4) Initial Calibration	No DV reports provided	Y	Y	Y	Y	Y
Curve (# of standards)	No DV reports provided	Y	Y	Y	Y	Y
5) Calibration Verification	No DV reports provided	20%	20%	20%	20%	10%
Secondary Column	No DV reports provided	Y	Y	Y	Y	NA
6) Laboratory Blanks	No DV reports provided	Y	Y - U based on BC	Y	Y	Y
7) Surrogate Recoveries (# required)	No DV reports provided	Y	Y	Y	Y	Y
8) Matrix Spike (# required)	No DV reports provided	Y - No quals. for %R outliers	Y - No quals. for %R outliers	Y - No quals. for %R outliers	Y	Y
9) Lab Duplicate	No DV reports provided	Y - MS/MSD	Y - MS/MSD	Y - MS/MSD	Y - MS/MSD	Y
Lab Control Sample (SRM results?)	No DV reports provided	Y	Y	Y	Y	Y
10) Gel Permeation/Forisil Cleanup	No DV reports provided	Not mentioned	Not mentioned	Not mentioned	Not mentioned	NA
11) Detection Limit	No DV reports provided	NA	NA	NA	NA	NA
12) Calc and Transposition Verification (Qualitative verification?)	No recalculations were provided unable to determine if transcription checks were done	No recalcs. provided, unable to determine if transcription checks were done	No recalcs. provided, unable to determine if transcription checks were done	No recalcs. provided, unable to determine if transcription checks were done	No recalcs. provided, unable to determine if transcription checks were done	No recalcs. provided, unable to determine if transcription checks were done
13) Field QC Results	Not addressed	None identified	None identified	None identified	None identified	None identified
14) Usability Usable/ Supporting	Supporting	Usable	Usable - Some results rejected for low surr. %R	Usable	Usable	Usable
Qualifiers	Y - Specific LLMB 3-character qual. codes	Y - HT, surr. %R, LCS %R	Y - Surr. %R, BC, U, coplanars, J/UJ diff between GC & HRGCMS, interference, coelutions	Y - Coelutions >calibration range	Y - HT, MS/MSD %R, surr. %R, PCB interference, all +J	Y - Dup RPD
15) Other IC Samples						
SAP						
QAPP						
Lab QAM						

Table 3-2 QC Elements for Data Sets Supporting the Fox River RI/FS and RA

	1994 GAS/SAIC Sediment Data							
Parameters: Requirements	**PCBs Sediment**	**PCBs Sediment**	**PCBs Sediment**	**PCBs Sediment**	**PCBs Sediment**	**PCBs Sediment**	**PCBs Sediment**	**PCBs Sediment**
SDG #s	ARI M172	ARI M174	ARI M176	ARI M177	ARI M178/ M179/M364	ARI M365	ARI M367/M368	ARI M370
Data Review								
1) Third-party Validation Performed	Y - SAIC	Y - SAIC	Y - SAIC	Y - SAIC	Y - SAIC	Y - SAIC	Y - SAIC	Y - SAIC
Deliverables								
1) Electronic Deliverables	Y	Y	Y	Y	Y	Y	Y	Y
2) Hardcopy	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed
Data Review Details								
1) Package Completeness	Y	Y	Y	Y	Y	Y	Y	Y
2) Chain of Custody Procedures	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined
3) Holding Times	Y (frozen)	Y - Some exceedances	Y	Y	Y - Some exceedances, 1 sample qual. J for gross exceedances (M178)	Y - Exceedances, several samples qual. J for gross exceedances (M365)	Y - Minor violations	Y - Minor violations
4) Initial Calibration	Y	Y	Y	Y	Y	Y	Y	Y
Curve (# of standards)	3–5 pt	3–5 pt	5 pt	5 pt	5 pt	5 pt	5 pt	5 pt
5) Calibration Verification	15 %D but avg. was higher, results flagged (J/UJ)	15 %D but avg. was higher, results flagged (J/UJ)	15 %D but avg. was higher, results flagged (J/UJ)	15 %D but avg. was higher, results flagged (J/UJ)	15 %D but avg. was higher, results flagged (J/UJ)	15 %D but avg. was higher, results flagged (J/UJ)	15 %D but avg. was higher, results flagged (J/UJ)	15%
Secondary Column	Not indicated	Not indicated	Not indicated	Not indicated	Not indicated	Not indicated	Not indicated	Not indicated
6) Laboratory Blanks	Y	Y	Y	Y	Y	Y	Y	Y
7) Surrogate Recoveries (# required)	TCMX 55%–115%/DCB 70%–125%	TCMX 55%–115%/DCB 70%–125%	TCMX 55%–115%/DCB 70%–125%	TCMX 55%–115%/DCB 70%–125%	TCMX 55%–115%/DCB 70%–125%	TCMX 55%–115%/DCB 70%–125%	TCMX 55%–115%/DCB 70%–125%	TCMX 55%–115%/DCB 70%–125%
8) Matrix Spike (# required)	35% min–130% max	35% min–130% max	35% min–130% max	35% min–130% max	35% min–130% max	35% min–130% max	35 min%–130% max	35 min%–130% max
9) Lab Duplicate	N	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned
Lab Control Sample (SRM results?)	Y	Y	Y	Y	Y	Y	Y	Y
10) Gel Permeation/Forisil Cleanup	Y - If necessary	Y - If necessary	Not sure	Not sure	Not sure	Not sure	Not sure	Not sure
11) Detection Limit	50 ppb wet wt	NA	NA	NA	NA	NA	NA	NA
12) Calc and Transposition Verification (Qualitative verification?)	Y - 10%?	N - No chros	ID & quants. could not be verified, raw data not provided	ID & quants. could not be verified, raw data not provided	ID & quants. could not be verified, raw data not provided	Data verified	N	Not verified
13) Field QC Results	None	None	None	Not identified	Not identified	Not identified	Not identified	Not identified
14) Usability Usable/ Supporting	Usable	Usable	Usable	Usable	Usable	Usable	Usable	Usable
Qualifiers	Y - Minor quals. assigned due to CCV (J/UJ)	Y - Minor quals. assigned due to CCV (J/UJ)	Y - Minor quals. assigned due to CCV, surr. recoveries J/UJ	Y - Minor quals. assigned due to CCV, surr. recoveries J/UJ	Y - Minor quals. assigned due to CCV, surr. recoveries J/UJ	Y - Minor quals. assigned due to CCV, surr. recoveries J/UJ	Y - Minor quals. assigned due to CCV, surr. recoveries J/UJ	Y - Minor quals. assigned due to surr. recoveries J/UJ
15) Other IC Samples								
SAP	Y							
QAPP	Y							
Lab QAM								

Table 3-2 QC Elements for Data Sets Supporting the Fox River RI/FS and RA

Parameters: Requirements	1994 GAS/SAIC Sediment Data (Continued)						
	Dioxins Sediment	**CLP Pest/PCBs Sediment**	**CLP SVOCs Sediment**	**CLP Metals Sediment**	**TCLP Metals Sediment**	**Mercury Sediment**	**Mercury Sediment**
SDG #s	Triangle Lab SDG #35589	Swanson/SDG 948521	Swanson/SDG 948521	Swanson/SDGs 12718, 12724, 12745, 12806, 12816, 12941	Swanson/SDGs 12718, 12724, 12730, 12827, 12718, 12802, 12833, 12844	Swanson WL12941	Swanson WL12745
Data Review							
1) Third-party Validation Performed	Y - SAIC	Y - SAIC	Y - SAIC	Y - SAIC	Y - SAIC	Y - SAIC	Y - SAIC
Deliverables							
1) Electronic Deliverables	Y	Y	Y	Y	Y	Y	Y
2) Hardcopy	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed
Data Review Details							
1) Package Completeness	Y	Y	N - Forms 1 not supplied by lab	Y	Y	N - Forms 1 not supplied by lab	Y
2) Chain of Custody Procedures	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined
3) Holding Times	Y - Minor violations	N - Samples sent to TL 10 days after collection	N - All samples exceeded HT & are qual. as estimated (J/UJ)	Y - Hg results are flagged for exceeding HT by 27–42 days (J/UJ)	Y	N - All samples exceeded HT & are qual. as estimated (J/UJ)	Y
4) Initial Calibration	Y	Y - Not consistent with CLP protocol	Y - Not consistent with CLP protocol	Y (validator recalc. Hg results)	Y	Y - Exceedance	Y - Exceedance
Curve (# of standards)	5 pt	5 pt	5 pt	Lin Reg	Lin Reg	5 pt	5 pt
5) Calibration Verification	20 %RSD	N - Correct concentration not used, certain analytes outside RT window	15 %D - Some exceedances qual. samples as estimated J/UJ	10 %D	10 %D	Y - 15%	Y - 15%
Secondary Column	NA	Not indicated	Not indicated	NA	NA	NA	NA
6) Laboratory Blanks	Y	Y	Y	Y	Y	Y	Y
7) Surrogate Recoveries (# required)	TCFD 25%–150%/TCDD 25%–150%	TCMX 55%–115%/DCB 70%–125%	8 required, 18% min–137% max	NA	NA	NA	NA
8) Matrix Spike (# required)	TCDD/TCDF 54–162	18/9 required, 29 min–152 max	11 required, 11% min–142% max	75%–125%	75%–125%	75%–125%	75%–125%
9) Lab Duplicate	Not mentioned	Not mentioned	Not mentioned	Y - 20%, Some exceedances qual. J/UJ	Y	Y	Y
Lab Control Sample (SRM results?)	Y	Y	Y - Acenapthene fell outside @ 53%	Y	Y	Y	Y
10) Gel Permeation/Forisil Cleanup	Not sure	Not sure	Not sure	NA	NA	NA	NA
11) Detection Limit	Elevated in some samples due to BC & noise	Elevated in some samples due to BC & noise	NA	NA	NA	NA	NA
12) Calc and Transposition Verification (Qualitative verification?)	Y - Sample IDs, sample quant. not reviewed	Not verifiable	Y	Y - Some calc. errors	Y	N	N
13) Field QC Results	Not identified	Not identified	Not identified	None	N	Y - FD	N
14) Usability Usable/ Supporting Qualifiers	Usable Y - Due to BC & elevated MSR sample results may be biased positive (J+)	Third-party validation considers it unusable Y - Major issues about overall quality of data, assoc. with RT drift, quality of work poor	Usable Y - Minor quals. due to HT exceedances & low surr. & spike recoveries (J/UJ)	Usable - 1 data point rejected for Zn Y - Minor & major quals. due poor spike recoveries (J/UJ) & (R) on Zn	Usable No quals.	Usable Y - Minor J flags	Usable Y - Minor UJ/J flags
15) Other IC Samples							
SAP							
QAPP							
Lab QAM							

Table 3-2 QC Elements for Data Sets Supporting the Fox River RI/FS and RA

	1994 GAS/SAIC Sediment Data (Continued)					1998 Fox River Group		
Parameters: Requirements	**Mercury Sediment**	**Mercury Sediment**	**Mercury Sediment**	**Mercury Sediment**	**Mercury Sediment**	**PCB Surface Water**	**Conventionals Surface Water**	**PCB Sediment**
SDG #s	Swanson WL12806	Swanson WL12812/ 12724/12718	Swanson WL12816/12882/ 12929/12922/ 12853/12852/12851	Swanson WL12688/ 12725/12783/ 12777	Swanson WL12693	Enchem Multiple SDGs	Enchem Multiple SDGs	Enchem Multiple SDGs
Data Review								
1) Third-party Validation Performed	Y - SAIC	Y - SAIC	Y - SAIC	Y - SAIC	Y - SAIC	Blasland Bouck & Lee	Blasland Bouck & Lee	Blasland Bouck & Lee
Deliverables								
1) Electronic Deliverables	Y	Y	Y	Y	Y	Y	Y	Y
2) Hardcopy	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed	Y - but not easily accessed	Y	Y	Y
Data Review Details								
1) Package Completeness	Y	Y	Y	Y	Y	Y	Y	Y
2) Chain of Custody Procedures	Not determined	Not determined	Not determined	Not determined	Not determined	Acceptable	Acceptable	Acceptable
3) Holding Times	Y	Y	N - Quals. J/UJ	Y	Y	Y	Y - TSS samples J flagged	Y - Dilutions done out of HT, diluted Aroclors J
4) Initial Calibration	Y - Exceedance	Y (validator recalc. results)	Y (validator recalc. results)	Y (validator recalc. results)	Y (validator recalc. results)	Y	Y	Y
Curve (# of standards)	5 pt	5 pt	5 pt	5 pt	5 pt			
5) Calibration Verification	Y - 15%	Y - 15%	Y - 15%	Y - 15%	Y - 15%	20%	10%	20%
Secondary Column	NA	NA	NA	NA	NA	20% qualitative only	NA	20% qualitative only
6) Laboratory Blanks	Y	Y	Y	Y	Y	Y	Y	Y
7) Surrogate Recoveries (# required)	NA	NA	NA	NA	NA	Y - Control limits not provided	Y - Control limits not provided	Y/Control limits not provided
8) Matrix Spike (# required)	75%–125%	75%–125%	75%–125%	75%–125%	75%–125%	Y - Control limits not provided	Y - Control limits not provided	Y - Control limits not provided
9) Lab Duplicate	Y	Used MS/MSD	Y - Occ. used MS/MSD SDG 12922 >35%	Y - Used MS/MSD	Y	Y - MS/MSD control limits not provided	Y - Control limits not provided	Y - MS/MSD control limits not provided
Lab Control Sample (SRM results?)	Y	Y (not always performed) - CLs were 75%–125%	Used MS/MSD (75%–125%)	Used MS/MSD (80%–120%)	Y	Y	Y	Y - Not addressed
10) Gel Permeation/Forisil Cleanup	NA	NA	NA	NA	NA	Not mentioned	NA	Not mentioned
11) Detection Limit	NA	NA	NA	NA	NA	NA	NA	NA
12) Calc and Transposition Verification (Qualitative verification?)	N	Y	Y - Recalc.	Y - Recalc.	Y - Recalc.	No recals. provided; unable to determine if transcription checks were done	No recalcs. provided; unable to determine if transcription checks were done	No recalcs. provided; unable to determine if transcription checks were done
13) Field QC Results	N	Y - OK on rinsate, FD (12812) failed No Action	Y - OK on rinsate, <35% on FD	Y - OK on rinsate, <20% on FD	Y - OK on rinsate, OK on FD	FDs - OK, rinsates had cont.	FDs - OK, rinsates had cont.	FDs - OK
14) Usability Usable/ Supporting	Usable	Usable	Usable	Usable	Usable	Usable	Usable - Except some TOC/DOC rejected	Usable
Qualifiers	Y - Minor UJ/J flags	Y - Minor quals. due to incorrect ICB calc.	Y - Minor J/UJ flags due to HT exceedances, SDG 12853 also qualifed on poor FD values	No quals.	Not apparent if no or some minor quals.	Y - Aroclor 1242 ND based on rinsate cont., UJ extraction errors, J/UJ low surr. %R	Y - TOC/DOC R DOC > TOC, all parameters U rinsate, TSS J HT	Y - Aroclor 1242 & 1254 J spectral overlap, J dilutions out of HT, minor CCAL %D
15) Other IC Samples								
SAP								
QAPP								
Lab QAM								

Table 3-2 QC Elements for Data Sets Supporting the Fox River RI/FS and RA

	1998 Fox River Group (Continued)					
Parameters: Requirements	**PCB Congeners Sediment**	**Pesticides Sediment**	**SVOC Sediment**	**Metals Sediment**	**TOC/Ammonia Sediment**	**PCB Fish Tissue**
SDG #s	Enchem Multiple SDGs	Quanterra Multiple SDGs	Enchem Multiple SDGs	Enchem Multiple SDGs	Enchem Multiple SDGs	Enchem Multiple SDGs
Data Review						
1) Third-party Validation Performed	Blasland Bouck & Lee	Blasland Bouck & Lee	Blasland Bouck & Lee	Blasland Bouck & Lee	Blasland Bouck & Lee	Blasland Bouck & Lee
Deliverables						
1) Electronic Deliverables	Y	Y	Y	Y	Y	Y
2) Hardcopy	Y	Y	Y	Y	Y	Y
Data Review Details						
1) Package Completeness	Y	Y	Y	Y	Y	Y
2) Chain of Custody Procedures	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
3) Holding Times	Y	Y	Y - 1 missed HT sample J/UJ	Y	Y - Some TOC & ammonia samples J	Y
4) Initial Calibration	Y	Y	Y	Y	Y	Y
Curve (# of standards)	NA	NA	NA	NA	NA	NA
5) Calibration Verification	30% target analytes, 40% internal stds.	20%	20%	10%	10%	20%
Secondary Column	NA	20% qualitative only	NA	NA	NA	20% qualitative only
6) Laboratory Blanks	Y	Y	Y	Y	Y	Y
7) Surrogate Recoveries (# required)	Y - Control limits not provided	Y - Control limits not provided	Y - Control limits not provided	Y - Control limits not provided	Y - Control limits not provided	Y - Control limits not provided
8) Matrix Spike (# required)	Y - Control limits not provided	Y - Control limits not provided	Y - Control limits not provided	Y - Control limits not provided	Y - Control limits not provided	Y - Control limits not provided
9) Lab Duplicate	Y - MS/MSD control limits not provided	Y - MS/MSD control limits not provided	Y - MS/MSD control limits not provided	Y - Control limits not provided	Y - Control limits not provided	Y - MS/MSD control limits not provided
Lab Control Sample (SRM results?)	Y	Y	Y	Y	Y	Y
10) Gel Permeation/Forisil Cleanup	Not mentioned	Not mentioned	Not mentioned	NA	NA	Not mentioned
11) Detection Limit	NA	NA	NA	NA	NA	NA
12) Calc and Transposition Verification (Qualitative verification?)	No recalcs. provided; unable to determine if transcription checks were done	No recalcs. provided; unable to determine if transcription checks were done	No recalcs. provided; unable to determine if transcription checks were done	No recalcs. provided; unable to determine if transcription checks were done	No recalcs. provided; unable to determine if transcription checks were done	No recalcs. provided; unable to determine if transcription checks were done
13) Field QC Results	None identified	FDs - OK	FDs - OK	FDs - OK	FDs - OK	None identified
14) Usability Usable/ Supporting	Usable	Usable	Usable - Except hexachlorocyclopentadiene rejected	Usable	Usable	Usable
Qualifiers	Y - 1 compound J/UJ CCAL D, MS/MSD/LCS low %R, poor peak resolution	N	Y - HCCP R 0% MS/MSD, minor CCAL %D, low surr. %R, & missed HT	Y - BC, low MS %R, RPD	Y - HT	Y - Aroclor 1242 & 1254 J spectral overlap, J/UJ due to extraction error
15) Other IC Samples						
SAP						
QAPP						
Lab QAM						

Table 3-2 QC Elements for Data Sets Supporting the Fox River RI/FS and RA

Parameters: Requirements	1992–1993 BBL Deposit A Sediment Data					1998–1999 Deposit N Data		
	VOA Soil	SVOC Soil	PCB Soil	Pesticides Soil	Metals/CN Soil	PCB Slurry, Soil, Liquid	PCB Congener Slurry, Soil, Liquid	TOC/DOC/TSS Slurry, Soil, Liquid
SDG #s	Hazleton 104116 203257	Hazleton 104116 203242	Hazleton SDG-1, SDG-2, SDG-3, SDG-4, SDG-5	Hazleton 104135 203256	Hazleton BASD34 SD01 BASD08	Severn Trent VT. Fox9, Fox10, Fox11, Fox12, Fox13, Fox14, Fox16	Severn Trent VT. Fox9, Fox10, Fox11, Fox12, Fox13, Fox14, Fox16	WSLH
Data Review								
1) Third-party Validation Performed	EcoChem	EcoChem	EcoChem	EcoChem	EcoChem	M. A. Kuehl Co.	M. A. Kuehl Co.	M. A. Kuehl Co.
Deliverables								
1) Electronic Deliverables	Y	Y	Y	Y	Y	Y	Y	Y
2) Hardcopy	Y	Y	Y	Y	Y	Y	Y	Y
Data Review Details								
1) Package Completeness	Y	Y	Y	Y	Y	Y	Y	Y
2) Chain of Custody Procedures	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
3) Holding Times	Y	Y	Y	Y	Y	Y - Some exceedances	Y - Some results J/UJ, some results rejected (>14 days)	Y - Some exceedances
4) Initial Calibration	Y	Y	Y	Y	Y	Y	Y	Y
Curve (# of standards)	Y - As required by method	Y - As required by method	Y - As required by method	Y - As required by method	Y - As required by method	NA	NA	NA
5) Calibration Verification	20%	20%	20%	20%	10%	15%	Y	Y
Secondary Column	NA	NA	Y	Y	NA	Y - Some %D exceedances	Y	NA
6) Laboratory Blanks	Y - Tics rejected due to cont.	Y - Tics rejected due to cont.	Y	Y	Y	Y	Y - Some results U based on MB cont.	Y
7) Surrogate Recoveries (# required)	Y	Y	Y	Y	Y	Y	Y	Y
8) Matrix Spike (# required)	Y - No MS/MSD for SDG 203257 J/UJ	Y - No MS/MSD for SDG 203242 J/UJ	Y	Y	Y	Y	Y	Y
9) Lab Duplicate	Y - No MS/MSD for SDG 203257 J/UJ	Y - No MS/MSD for SDG 203242 J/UJ	Y	Y	Y	Y	Y	Y
Lab Control Sample (SRM results?)	Y - No LCS for SDG 203257 J/UJ	Y - No LCS for SDG 203242 J/UJ	Y	Y	Y	Y - Some %R outliers	Y - Some %R outliers	Y
10) Gel Permeation/Forisil Cleanup	NA	NA	NA	NA	NA	Not addressed	Not addressed	NA
11) Detection Limit	NA	NA	NA	NA	NA	NA	NA	NA
12) Calc and Transposition Verification (Qualitative verification?)	Y	Y	Y	Y	Y	Y	Y	Y
13) Field QC Results	None identified	None identified	Y	Y	None identified	Y	Y - Some outliers, no quals. assigned	Y - DOC RPD outlier
14) Usability Usable/ Supporting	Usable - Tics rejected due to cont.	Usable - Tics rejected due to cont.	Usable	Usable	Usable	Usable - Some results rejected due to possible cross cont.	Usable - Some results rejected due to exceeded HT	Usable
Qualifiers	Y - BC U, Ical RSD, CCAL %D, no LCS MS/MSD TICs rejected due to BC	Y - BC, CCAL %D, Internal std. %R, NO LCS MS/MSD, TICs rejected due to BC	Y - Surr. %R, LCS %R, FD RPD 1242	Y - RPD between main & confirmation columns NJ	Y - BC, ICV %R CN, MS %R, GFAA post-spike %R	Y - Cooler temps., CCAL %D, HT, LCS %R, dual column %D	Y - HT, cooler temps., CCAl %D, MB cont., LCS %R, over cal	Y - HT, cooler temps., FD RPD, DOC>TOC
15) Other IC Samples								
SAP								
QAPP								
Lab QAM								

Table 3-2 QC Elements for Data Sets Supporting the Fox River RI/FS and RA

	1998–1999 Deposit N Data (Continued)					
Parameters: Requirements	**PCB Sludge**	**PCB Congener Sludge**	**TOC Sludge**	**PCB Congener Surface Water**	**PCB Fish**	**PCB Congener Minnow**
SDG #s	Severn Trent VT. Fox17, Fox18	Severn Trent VT. Fox17, Fox18	Severn Trent VT. Fox17, Fox18	WSLH	Severn Trent VT. Fox7	WSLH
Data Review						
1) Third-party Validation Performed	M. A. Kuehl Co.	M. A. Kuehl Co.	M. A. Keuhl Co.	M. A. Keuhl Co.	M. A. Keuhl Co.	M. A. Keuhl Co.
Deliverables						
1) Electronic Deliverables	Y	Y	Y	Y	Y	Y
2) Hardcopy	Y	Y	Y	Y	Y	Y
Data Review Details						
1) Package Completeness	Y	Y	Y	Y	Y	Y
2) Chain of Custody Procedures	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
3) Holding Times	Y	Y	Y	Y	Y	Y
4) Initial Calibration	Y	Y	Y	Y	Y	Y
Curve (# of standards)	NA	NA	Y	Y	Y	Y
5) Calibration Verification	Y	Y	Y	Y	Y	Y
Secondary Column	Y - %D outliers	Y	NA	Y	Y	Y
6) Laboratory Blanks	Y	Y	Y	Y - Some results U because of MB cont.	Y	Y
7) Surrogate Recoveries (# required)	Y	Y	Y	Y	Y	Y
8) Matrix Spike (# required)	Y	Y - Some %R & RPD outliers	Y	N - Not enough sample	N	Y
9) Lab Duplicate	Y	Y	Y - Some RPD outliers	Y	Y	Y
Lab Control Sample (SRM results?)	Y - Some %R outliers	Y	Y - 1 outlier	Y	Y	Y
10) Gel Permeation/Forisil Cleanup	Not addressed	Not addressed	NA	Not addressed	Not addressed	Not addressed
11) Detection Limit	NA	NA	NA	NA	NA	NA
12) Calc and Transposition Verification (Qualitative verification?)	Y	Y	Y	Y	Y	Y
13) Field QC Results	Y	Y - Some outliers, no quals. assigned	Y - Some RPD outliers	Y - Some outliers, no quals. assigned	Y	Y
14) Usability Usable/ Supporting	Usable	Usable	Usable	Usable	Usable	Usable
Qualifiers	Y - Dual column %D outliers	Y - CCAL %D outliers, MS/MSD %R & RPD outliers, LCS %R, over cal	Y - LCS %R, dup. RPD, FD RPD	Y - BC, results <LOQ	N	Y - Reported results <LOQ
15) Other IC Samples						
SAP						
QAPP						
Lab QAM						

4 Analytical and Archive Databases

Electronic data have undergone reduction and standardization and currently reside in both a working database (designed for the internal support of the ongoing RA and RI/FS processes) and the FRDB, complete with user interface.

The development of the FRDB required the data management and manipulation of the source data as described previously. Data were acquired prior to design and development of an appropriate and complete underlying data structure. An outline of the data structure is included in Attachment 1.

The FRDB, designed in Microsoft Access©, includes available environmental analytical data as well as capacity to store bibliographical information for available reports, research studies, and other documents compiled on the Fox River. The basic structure of the database includes several tables that store the actual data and bibliographical information along with several other "lookup" tables (Attachment 2) and indices that will allow flexibility in searching for information included in the database. The basic table structure and relationships are depicted in Attachment 3. A summary of each table's function within the database is described as follows:

- **Analytical Table.** This table stores all of the analytical information including fields such as analyte, result, qualifier, etc. This is the core of the analytical data processed and validated by EcoChem. Searches of the database can run on several of the fields contained in this table. This table has relationships with the Analysis Type and Qualifier lookup tables.

- **Data Dictionary Table.** This table contains definitions of the fields used in the Fox River database.

- **Data Set Table.** This table, along with the QA Status Lookup Table listed below, is used to store information regarding the quality assurance or validation level of each of the overall data sets that encompass a sample grouping. A relationship exists with the Document Archive Table that enables reference to a document that exclusively describes a data set.

- **Document Archive Table.** This table contains document and bibliographical information related to Fox River sample data. This table includes information such as the main author's name, additional author names, year of publication or release, subject, title, publication type, keywords and, when available, an abstract of the document and/or a hyperlink to online or electronic copies of the document and associated analytical data. Complete bibliographies from several sources (some not directly related to this project) have been added to this table creating a reference library of over 2,000 sources.

- **Sample Attribute Table.** Information regarding each unique sample is stored in this table. This table has relationships with Data Set and Analytical tables, in addition to six lookup tables. The Deposit, Location, Matrix, Sample Area, Sample Type, and Species lookup tables enable fast and efficient searches of sample attributes.

- **Analysis Type Lookup Table.** This table contains the key data on the type of each analyte in the Analytical Table.

- **Deposit Lookup Table.** This table contains the key data on the named deposit from which a sample was extracted, if a deposit exists for a particular sample.

- **Location Lookup Table.** This table contains the key data on the general location of a sample's origin.

- **Matrix Lookup Table.** This table holds the key data for the matrix type of each sample.

- **QA Status Lookup Table.** The key data on the quality assurance level of each data set contained in the Data Set Table is stored in this table.

- **Qualifier Lookup Table.** This table holds key data on the data qualifier assigned to each analyte in the Analytical Table.

- **Sample Area Lookup Table.** This table contains the key data on more specific locations for sample origins than the Location Table.

- **Sample Type Lookup Table.** This table contains key data on the type or form of each sample that is more specific than that contained in the Matrix Table.

- **Species Lookup Table.** This table contains key data on the common or specific name for a sample and the risk pathway that the sample is associated with. For example, a sample originating from the fish carp is listed under benthic fish for an ecological risk pathway and under food fish for a human health risk pathway.

The FRDB has been customized to include various user interfaces and search capabilities that enable access to the stored data by those who are not familiar with retrieving data from a database application. Help capability and integral database definitions are included. In addition, the database is available via a web server, thus allowing access to the data contained in the database by anyone with Internet capability and a web browser.

Finally, the FRDB is designed with a basic relational structure that will allow data addition in the future as well as the easy migration of the data to other relational database systems. Instructions for importing additional data are included in Attachment 4.

Appendix A

Data Validation Report

Attachment 1

Data Structure Outline

Table	Fox River Database Field	EcoChem Field	Data Type	Length	Index
Data Set Table	DataSet_ID	Primary key	autonumber	---	yes, no dups
	DataSet	DATASET	text	50	yes, no dups
	Description	to be added	text	100	
	QA_Status_ID	foreign key from QA STATUS lookup	long integer	---	yes
	Validator	VALIDATOR	text	20	yes
QA Status Lookup	QA_Status_ID	Primary key	autonumber	---	yes, no dups
	QA_Status	QASTATUS	text	15	yes, no dups
	Description	to be added	text	100	
Sample Attribute Table	SampleAttribute_ID	Primary key	autonumber	---	yes, no dups
	Sample_ID	SAMPID	text	30	yes
	DataSet_ID	foreign key from DATASET table	long integer	---	yes
	Location_ID	foreign key from LOCATION table	long integer	---	yes
	Deposit_ID	foreign key from DEPOSIT table	long integer	---	yes
	SampleArea_ID	foreign key from SAMPLEAREA table	long integer	---	yes
	BlindID	BLIND_ID	text	12	
	Depth	DEPTH	text	14	
	StartDepth	DEPTHFROM	text	10	yes
	EndDepth	DEPTHTO	text	10	yes
	DepthUnits	DEPTHUNITS	text	5	
	CoreGrab	CORE_GRAB	text	20	yes
	Northing	NORTHING	text	15	yes
	Easting	EASTING	text	15	yes
	County	COUNTY	text	20	yes
	SampleDate	SAMPDATE	text	10	yes
	SampledBy	SAMPLER	text	10	yes
	CollectionCompany	COMPANY	text	30	yes
	DateLabReceived	DATE_RCV	text	10	
	DateLabExtracted	DATE_EXT	text	10	
	Matrix_ID	foreign key from MATRIX lookup	long integer	---	yes
	SampleType_ID	foreign key from SAMPLE TYPE lookup	long integer	---	yes
	Species_ID	foreign key from SPECIES lookup	long integer	---	yes
	DBTimeStamp	TIMESTAMP	date/time	---	
Sample Area Lookup	SampleArea_ID	Primary key	autonumber	---	yes, no dups
	SampleArea	LOC_DESC	text	100	yes, no dups

Table	Fox River Database Field	EcoChem Field	Data Type	Length	Index
Location Lookup	Location_ID	Primary key	autonumber	---	yes, no dups
	Location	LOCATION	text	50	yes, no dups
	Description	to be added	text	100	
Deposit Lookup	Deposit_ID	Primary key	autonumber	---	yes, no dups
	Deposit	DEPOSIT	text	15	yes, no dups
	Description	to be added	text	100	
Matrix Lookup	Matrix_ID	Primary key	autonumber	---	yes, no dups
	Matrix	MEDIA	text	25	yes, no dups
	Description	to be added	text	50	
Sample Type Lookup	SampleType_ID	Primary key	autonumber	---	yes, no dups
	SampleType	SAMPLETYPE	text	30	yes, no dups
	Description	to be added	text	50	
Species Lookup	Species_ID	Primary key	autonumber	---	yes
	CommonName	SPECIES	text	30	yes, no dups
	EcoRisk	GROUP	text	20	same index
	HHRisk	GROUP2	text	20	same index
	Species	TRUESPECIES	text	20	

Table	Fox River Database Field	EcoChem Field	Data Type	Length	Index
Analytical Table	Analytical_ID	Primary key	autonumber	---	yes
	SampleAttribute_ID	foreign key from SAMPLE ATTRIBUTE table	text	30	yes
	Analyte	ANALYTE	text	50	yes
	Result	RESULT	text	15	yes
	Qualifier	foreign key from QUALIFIER lookup	text	6	yes
	Units	UNITS	text	15	
	AnalysisType_ID	foreign key from ANALYSIS TYPE table	long integer	---	yes
	ReportingBasis	BASIS	text	20	
	SDG	SDG	text	10	
	DetectionLimit	DETLIMIT	text	15	
	Aliquot	ALIQUOT	text	10	
	Method	METHOD	text	20	yes
	LabID	LABID	text	15	
	AnalyteOld	ANALYTEOLD	text	50	
	ResultOld	RESULTOLD	text	50	
	QualifierOld	QUALOLD	text	6	
	Comments	COMMENT	text	110	
	Lab	LAB	text	20	yes
	ImportFile	IMPORTFILE	text	15	
	Source	SOURCE	text	100	yes
Qualifier Lookup	Qualifier	QUAL (primary key)	text	6	yes, no dups
	Description	to be added	text	50	

Table	Fox River Database Field	EcoChem Field	Data Type	Length	Index
Document Archive	Document_ID	Primary key	autonumber	---	yes, no dups
	DataSet_ID	foreign key from DATASET table	long integer	---	yes, no dups
	Author		text	200	
	Year		text	4	
	Title		text	255	
	SecondaryTitle		text	150	
	Journal		text	75	
	Volume		text	3	
	Issue		text	10	
	Pages		text	10	
	AlternateJournal		text	75	
	CallNumber		text	25	
	Label		text	20	
	Keywords		text	225	
	Abstract		memo	---	
	Notes		text	40	
	City		text	20	
	Institution		text	75	
	Date		text	20	
	Publisher		text	50	
	SeriesEditor		text	35	
	SeriesTitle		text	100	
	Edition		text	5	
	Newspaper		text	75	
	ConferenceLocation		text	50	
	ConferenceYear		text	4	
	ConferenceName		text	50	
	AcademicDepartment		text	50	
	University		text	30	
	Programmer		text	40	
	Cartographer		text	40	
	Scale		text	20	
	AccessYear		text	4	
	AccessDate		text	25	
Analysis Type Lookup	AnalysisType_ID	Primary key	autonumber	---	yes, no dups
	AnalysisType	METHODTYPE	text	15	yes, no dups
Data Dictionary	Field	Primary key	text	30	yes, no dups
	Description	to be added	text	150	

Attachment 2

Lookup Tables

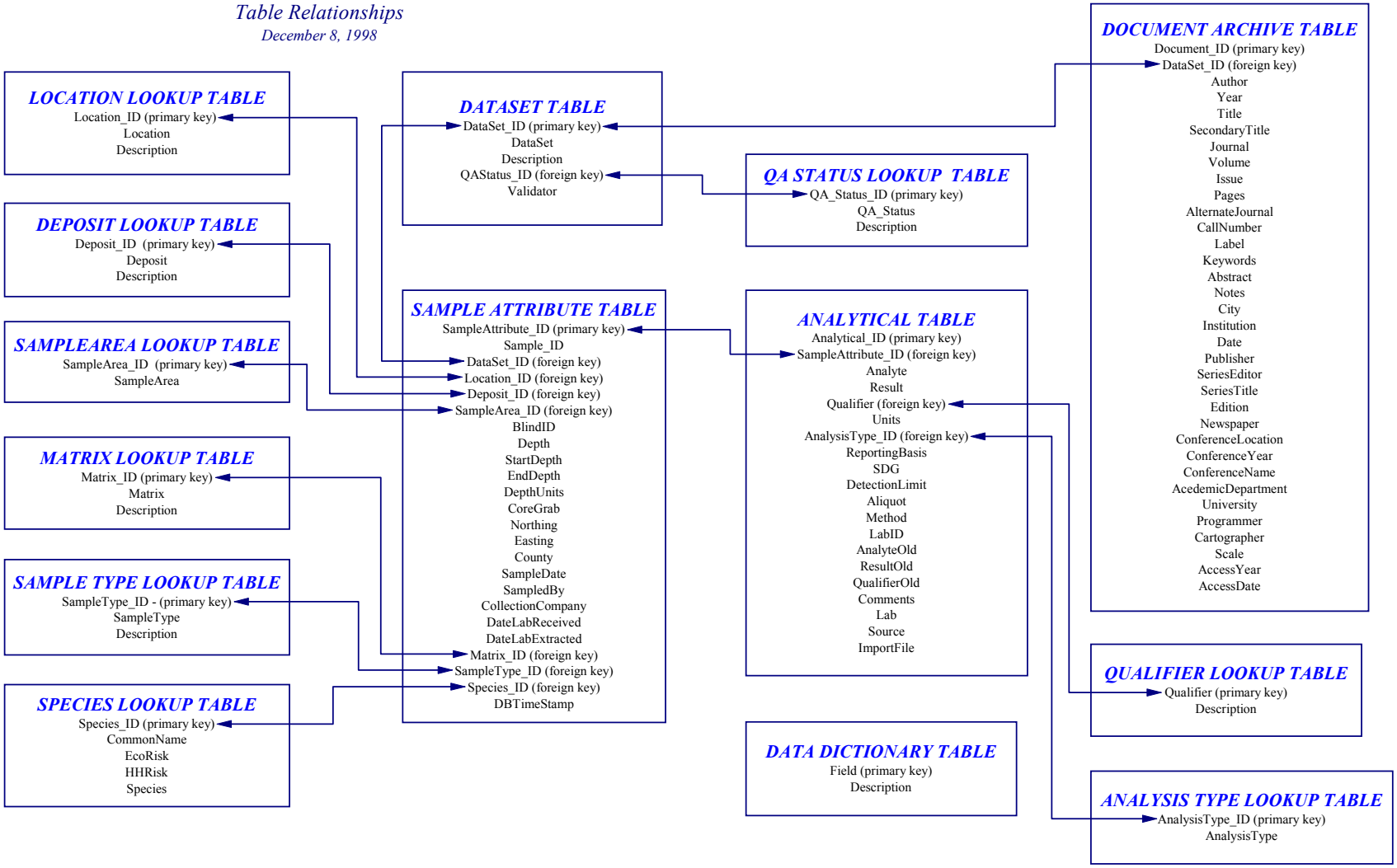
Local Lookup Tables and Queries for Fox River Database Forms.mdb File (Table 1)

Table Name	Query to Populate the Table	Forms Using the Table
tblLookup_CriteriaForLists	None – static table (DO NOT ALTER)	frmDataList
tblLookup_FieldsForLists	None – static table (DO NOT ALTER)	frmDataList
tblLookup_SortFieldsForSearches	None – static table (DO NOT ALTER)	frmDataSearch
tblLookup_Unique_AnalysisType	Append tblLookup_Unique_AnalysisType	frmDataList
tblLookup_Unique_Analyte	Append tblLookup_Unique_Analyte	frmDataList, frmDataSearch, frmStatistic
tblLookup_Unique_CollectionCompany	Append tblLookup_Unique_CollectionCompany	frmDataList
tblLookup_Unique_CommonName	Append tblLookup_Unique_CommonName	frmDataList
tblLookup_Unique_CoreGrab	Append tblLookup_Unique_CoreGrab	frmDataList
tblLookup_Unique_County	Append tblLookup_Unique_County	frmDataList
tblLookup_Unique_DataSet	Append tblLookup_Unique_DataSet	frmDataSearch
tblLookup_Unique_Deposit	Append tblLookup_Unique_Deposit	frmDataList
tblLookup_Unique_EcoRisk	Append tblLookup_Unique_EcoRisk	frmDataList
tblLookup_Unique_EcoRiskAndCommonName	Append tblLookup_Unique_EcoRiskAndCommonName	frmDataSearch
tblLookup_Unique_HHRisk	Append tblLookup_Unique_HHRisk	frmDataList
tblLookup_Unique_HHRiskAndCommonName	Append tblLookup_Unique_HHRiskAndCommonName	frmDataSearch
tblLookup_Unique_Lab	Append tblLookup_Unique_Lab	frmDataList
tblLookup_Unique_Location	Append tblLookup_Unique_Location	frmDataList
tblLookup_Unique_LocationAndDeposit	Append tblLookup_Unique_LocationAndDeposit	frmDataSearch
tblLookup_Unique_Matrix	Append tblLookup_Unique_Matrix	frmDataList
tblLookup_Unique_MatrixAndSampleType	Append tblLookup_Unique_MatrixAndSampleType	frmDataSearch
tblLookup_Unique_Method	Append tblLookup_Unique_Method	frmDataList
tblLookup_Unique_QAStatus	Append tblLookup_Unique_QAStatus	frmDataList
tblLookup_Unique_Qualifier	Append tblLookup_Unique_Qualifier	frmDataSearch
tblLookup_Unique_SampledBy	Append tblLookup_Unique_SampledBy	frmDataList
tblLookup_Unique_SampleID	Append tblLookup_Unique_SampleID	frmDataList
tblLookup_Unique_SampleType	Append tblLookup_Unique_SampleType	frmDataList
tblLookup_Unique_Source	Append tblLookup_Unique_Source	frmDataList
tblLookup_Unique_StatisticsChoices	Append tblLookup_Unique_StatisticsChoices	frmStatistic
tblLookup_Unique_Validator	Append tblLookup_Unique_Validator	frmDataList

FOX RIVER DATABASE

Table Relationships

December 8, 1998



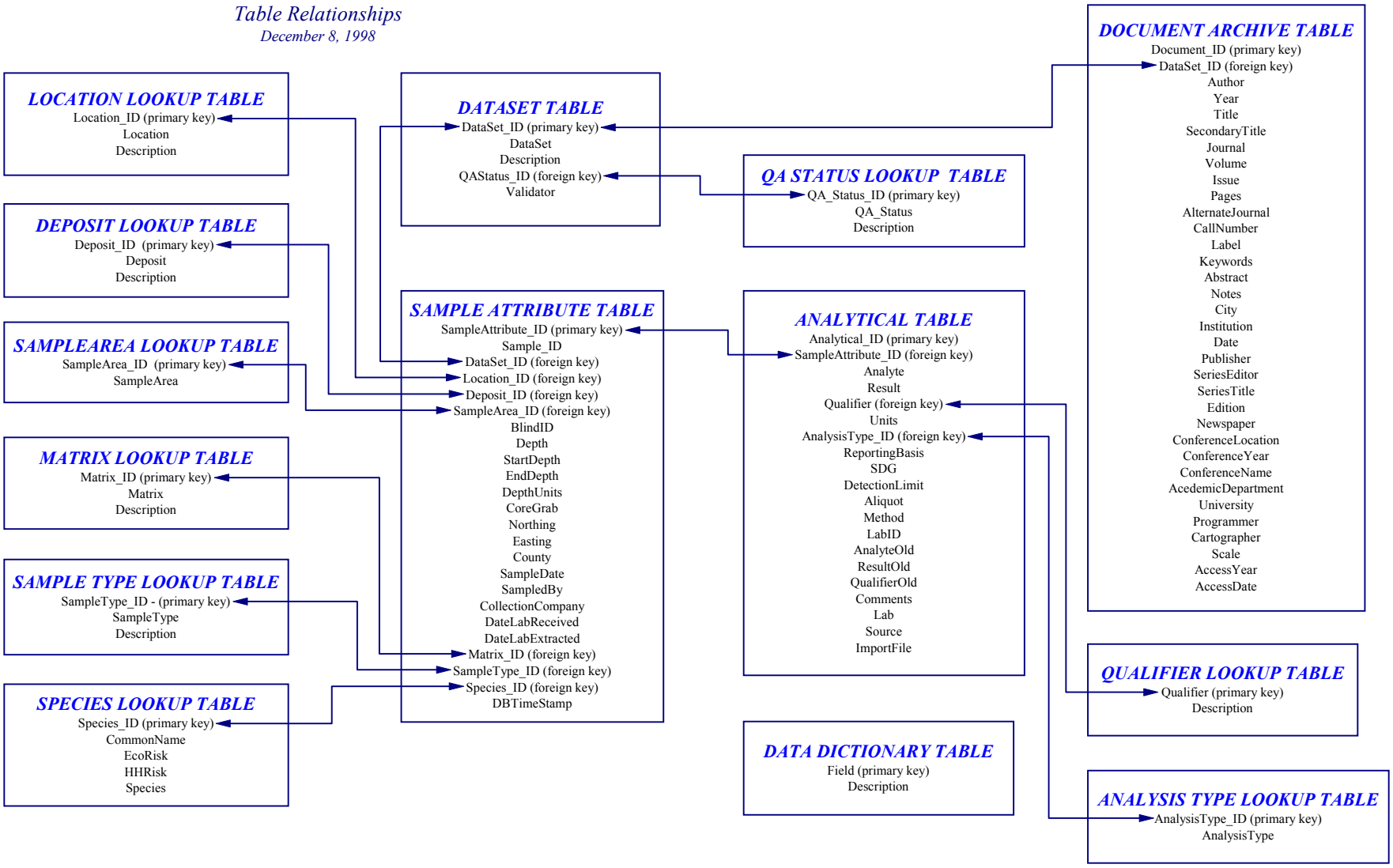
Attachment 3

Table Structure and Relationships

FOX RIVER DATABASE

Table Relationships

December 8, 1998



Attachment 4

Data Importing Instructions

I. Importing Data to the Fox River Database for the First Time (empty database):

Steps for the FoxRiverData.mdb Database File:

1. Import raw data to a new table called SAMPLES in the Fox River Data Tables database. Fields in this import table should be named as below (names in parentheses are the actual database field names). All fields should be of text data type except for TIMESTAMP, which should be of date/time type. TIMESTAMP should be left blank in the import file because a date/time value is added when the data is entered into the database.

a. SAMPID (Sample_ID)
b. ANALYTE (Analyte)
c. RESULT (Result)
d. QUAL (Qualifier)
e. UNITS (Units)
f. SAMPDATE (SampleDate)
g. MEDIA (Matrix)
h. LABID (LabID)
i. DATE_RCV (DateLabReceived)
j. DATE_EXT (DateLabExtracted)
k. DETLIMIT (DetectionLimit)
l. SDG (SDG)
m. IMPORTFILE (ImportFile)
n. SOURCE (Source)
o. DATASET (DataSet)
p. LAB (Lab)
q. VALIDATOR (Validator)
r. QASTATUS (QA_Status)
s. LOCATION (Location)
t. DEPTH (Depth)
u. DEPTHFROM (StartDepth)
v. DEPTHTO (EndDepth)
w. DEPTHUNITS (DepthUnits)
x. SPECIES (CommonName)
y. ALIQUOT (Aliquot)
z. METHODTYPE (AnalysisType)
aa. METHOD (Method)
bb. BLIND_ID (BlindID)
cc. SAMPLER (SampledBy)
dd. COMMENT (Comments)
ee. DEPOSIT (Deposit)
ff. NORTHING (Northing)
gg. EASTING (Easting)
hh. GROUP (EcoRisk)
ii. GROUP2 (HHRisk)
jj. COREGRAB (CoreGrab)
kk. ANALYTEOLD (AnalyteOld)
ll. LOC_DESC (SampleArea)
mm. SAMPLETYPE (SampleType)
nn. COUNTY (County)
oo. RESULTOLD (ResultOld)
pp. QUALOLD (QualifierOld)
qq. TRUESPECIES (Species)
rr. COMPANY (CollectionCompany)
ss. BASIS (ReportingBasis)
tt. TIMESTAMP (DBTimeStamp)

2. Run qryTimeStamp_ImportFile to date/time stamp the entry of new samples into the database. This allows for easier importing of new samples in the future as well as keeping a record of when samples were first entered into the database.

3. Populate lookup tables by running the these queries in the exact order listed below:
   a. qryPopulate_Unique_AnalysisType
   b. qryPopulate_Unique_QAStatus
   c. qryPopulate_Unique_DataSet
   d. qryPopulate_Unique_Deposit
   e. qryPopulate_Unique_Location
   f. qryPopulate_Unique_Matrix
   g. qryPopulate_Unique_Qualifier
   h. qryPopulate_Unique_SampleArea
   i. qryPopulate_Unique_SampleType
   j. qryPopulate_Unique_Species

4. Run qryPopulate_Unique_SampleAttribute to populate tblSampleAttribute.

5. Run qryPopulate_Unique_Analytical to populate tblAnalytical.

6. Run qryPopulate_tblDocumentArchive_WithDataSets to populate DataSet_ID field in tblDocumentArchive with DataSet_IDs from tblDataSet.

Steps for the Fox River Database Forms.mdb Database File:

1. Run the queries listed in Table 1 to populate the local lookup tables. The queries must be run in the order that they are listed in Table 1. The first three database tables listed in Table 1 are static tables and should never be altered.

II. Subsequent Importing of Data to the Fox River Database (populated database):

1. To import additional data to the Fox River Database after the database has been filled initially, follow the same steps as outlined above for entering data into the FoxRiverData.mdb file. The lookup tables have indexed fields to prevent entry of duplicate data. When the lookup queries are run and you are trying to enter duplicate data, Access© will show an error message that some data will not be added due to key violations. Choose the option to run the query anyway, and only the new data will be added to the database.

2. After the new data has been added, you must change the lookup tables in the Fox River Database Forms.mdb file. Open the database lookup tables listed in Table 1 and delete all records in each table. After all data has been deleted from all lookup tables, run the Table 1 queries in the order listed to repopulate the lookup tables with the updated database data.

3. The updated Fox River Database Forms.mdb must then be distributed to all users. Replace the old copy of the file with the updated version.

III. Populating the Fox River Web Database File (Fox River Web DB.mdb):

1. For first time populating of data to the web database file (empty database), import the following tables from the respective Access© database files created above:

FoxRiverData.mdb:
- tblAnalysisType
- tblAnalytical
- tblDataDictionary
- tblDataSet
- tblDeposit
- tblDocumentArchive
- tblLocation
- tblMatrix
- tblQA_Status
- tblQualifier
- tblSampleArea
- tblSampleAttribute
- tblSampleType
- tblSpecies

Fox River Database Forms.mdb:
- tblLookup_CriteriaForLists
- tblLookup_FieldsForLists
- tblLookup_SortFieldsForSearches
- tblLookup_Unique_AnalysisType
- tblLookup_Unique_Analyte
- tblLookup_Unique_CollectionCompany
- tblLookup_Unique_CommonName
- tblLookup_Unique_CoreGrab
- tblLookup_Unique_County
- tblLookup_Unique_DataSet
- tblLookup_Unique_Deposit

tblLookup_Unique_EcoRisk
tblLookup_Unique_EcoRiskAndCommonName
tblLookup_Unique_HHRisk
tblLookup_Unique_HHRiskAndCommonName
tblLookup_Unique_Lab
tblLookup_Unique_Location
tblLookup_Unique_LocationAndDeposit
tblLookup_Unique_Matrix
tblLookup_Unique_MatrixAndSampleType
tblLookup_Unique_Method
tblLookup_Unique_QAStatus
tblLookup_Unique_Qualifier
tblLookup_Unique_SampledBy
tblLookup_Unique_SampleID
tblLookup_Unique_SampleType
tblLookup_Unique_Source
tblLookup_Unique_StatisticsChoices
tblLookup_Unique_Validator

2. When new data is imported into the Access database as above, you must repopulate the web database file to reflect the new data. To do this, delete all tables in the Fox River Web DB.mdb file except for the static tables listed below. After the tables have been deleted, compact the database file to clear the deleted tables file space. Then, import all tables as described in Step 1 above.

   tblLookup_CriteriaForLists
   tblLookup_FieldsForLists
   tblLookup_SortFieldsForSearches

Addendum 1 to the Data Management Summary Report (EcoChem, 2002)

DATA MANAGEMENT SUMMARY REPORT, ADDENDUM 1
FOX RIVER REMEDIAL INVESTIGATION/FEASIBILITY STUDY

November 25, 2002

ADDENDUM 1 TO THE DATA MANAGEMENT SUMMARY REPORT

Note: As data are collected, reviewed (or validated), and appended to the Fox River Database (FRDB), the Data Management Summary Report will also be appended. A description of the data set, along with results of data review/validation and determination of usability will be discussed in consecutively numbered sections.

As supporting tables (Table 3-1: Data Set Analysis and Table 3-2: QC Elements for Data Sets Supporting the Fox River RI/FS and RA) are appended, the tables will be resubmitted (with each Addendum) in their entirety.

3.2.29 1999 DEMONSTRATION PROJECT DATA - SMU 56/57

This data set has now been appended to the Fox River Database (FRDB) and has been included in Tables 3-1, Data Set Analysis. All previous discussion remains valid, as presented in the DMR, October, 2000.

3.2.30 2000/2001 FRG/CH2M HILL SEDIMENT & WOOD CHIP DATA

CH_2M Hill collected soil/sediment (and one set of wood chip) samples in 2000 and 2001 for the Fox River Group (FRG). The samples were collected from the Little Lake Butte des Morts area. Samples were analyzed for polychlorinated biphenyl (PCB) Aroclors, metals, volatile organics, semivolatile organics, gasoline- and diesel-range organics, and cyanide. The data set consisted of 428 samples.

EcoChem performed a review of the FRG 2000 and 2001 data validation conducted by CH_2M Hill. EcoChem evaluated the validation results for completeness and technical agreement. The samples were analyzed by United States Environmental Protection Agency (EPA) SW-846 methodology and other miscellaneous EPA methods. The gasoline- and diesel-range analyses were conducted using the Wisconsin GRO and DRO methods. The validation protocols used by CH_2M Hill were not specified.

Overall the data are of acceptable quality. The samples appear to have analyzed as per the cited methods, and the validation worksheets generally follow the guidelines specified in *U.S. EPA National Functional Guidelines for Organic Data Review* (February 1994) and *U.S. EPA National Functional Guidelines for Inorganic Data Review* (February 1994). No validation reports were provided. The information reviewed consisted of data validation worksheets and annotated sample result summary forms. The validation worksheets were often not complete. However, there is sufficient information in the notes made by the validator (in the worksheet comments section) to indicate that the data were reviewed, and the issue is one of incomplete documentation, rather than an incomplete review. Most of the worksheets do not include the date that the validation was performed, or the name of the validator. Some of the sample result summary forms were also not dated.

Many of the data qualifiers issued by CH_2M Hill were due to interference caused by the natural overlap of some of the Aroclors (such as Aroclors 1242 and 1254). It is not

possible to evaluate these findings without reviewing the raw data. A more detailed review of the data may result in the removal of some of these qualifiers. For the semivolatile analyses in data package 913426, the qualifiers on the sample result summary forms do not match those discussed in the validation worksheet. A more detailed review of the data for this package would result in additional qualifiers (estimated data). However, the above changes would not significantly impact the reported data. As determined by this review, the data, as qualified, are usable for the intended purpose.

3.2.31 2000 FRG/BBL SUPPLEMENTAL MONITORING PROGRAM DATA: SURFACE WATER

Blasland Bouck & Lee (BBL) collected surface water, particulate, and XAD filter samples in 2000 for the FRG. The samples were collected as part of the Supplemental Monitoring Program – Surface Water. Samples were analyzed for PCB Aroclors, PCB congeners, total suspended soils (TSS), total volatile suspended solids (TVSS), and total organic carbon (TOC). The data set consisted of 205 samples. Not all samples were analyzed for all tests.

EcoChem performed a review of the FRG 2000 data validation conducted by BBL. EcoChem evaluated the validation worksheets and reports for completeness and technical agreement. The samples were analyzed by EPA SW-846 methodology and other miscellaneous EPA methods. The validation report states that the qualifiers are "in accordance with National Functional Guidelines." The date of the version of Functional Guidelines used is not provided. The validation worksheets do not provide the name(s) of the validator(s), or the date that the validation was performed. The sample result summary forms are usually not initialed and dated.

The samples appear to have analyzed as per the cited methods, and the validation worksheets generally follow the guidelines specified in *U.S. EPA National Functional Guidelines for Organic Data Review* (February 1994) and *U.S. EPA National Functional Guidelines for Inorganic Data Review* (February 1994).

For one PCB congener data package, when qualifiers were recommended (in the validation worksheet) based on blank contamination, the sample result summary forms were not qualified. Rather, the reporting limits were elevated, but no "U" qualifier was added to the summary form. During a more detailed review, EcoChem would add the qualifiers. Although surrogate and laboratory control sample (LCS) recovery outliers were noted, no action was taken. A more detailed review of the data would most likely result in additional qualifiers (estimated data). Overall the data are of acceptable quality. The data, as qualified, are usable for the intended purpose.

3.2.32 2000/2001 FRG/BBL SUPPLEMENTAL MONITORING PROGRAM DATA: SEDIMENT DATA

BBL collected sediment samples in 2000 and 2001 for the FRG. The samples were collected as part of the Supplemental Monitoring Program. Samples were analyzed for PCB congeners (one data set), PCB Aroclors, TOC, and grain size. The data set consisted of 158 samples.

EcoChem performed a review of the FRG 2001 data validation conducted by BBL. EcoChem evaluated the validation worksheets and reports for completeness and technical agreement. The samples were analyzed by EPA SW-846 methodology and other miscellaneous EPA methods. The validation report states that the qualifiers are "in accordance with National Functional Guidelines." The date of the version of Functional Guidelines used is not provided. The validation worksheets do not provide the name(s) of the validator(s), or the date that the validation was performed. The sample result summary forms are usually not initialed and dated.

The samples appear to have analyzed as per the cited methods, and the validation worksheets generally follow the guidelines specified in *U.S. EPA National Functional Guidelines for Organic Data Review* (February 1994) and *U.S. EPA National Functional Guidelines for Inorganic Data Review* (February 1994). Only sample results were provided for the grain size analyses, so these were not validated.

Overall the data are of acceptable quality. Qualifiers were issued based on a matrix spike recovery outlier. However, the associated matrix spike duplicate and LCS were acceptable. A more detailed review of the data would most likely result in removal of the qualifiers. With this change, no data would be qualified. The data are usable for the intended purpose.

3.2.33 2001 FRG/BBL GREEN BAY SEDIMENT SAMPLING DATA

BBL collected sediment samples in 2001 for the FRG. The samples were collected as part of the Green Bay Sediment Sampling event. Samples were analyzed for PCB Aroclors, TOC, and grain size. The data set consisted of 30 samples.

EcoChem performed a review of the FRG 2001 data validation conducted by BBL. EcoChem evaluated the validation worksheets and reports for completeness and technical agreement. The samples were analyzed by EPA SW-846 methodology and other miscellaneous EPA methods. The validation report states that the qualifiers are "in accordance with National Functional Guidelines." The date of the version of Functional Guidelines used is not provided. The validation worksheets do not provide the name(s) of the validator(s), or the date that the validation was performed. The sample result summary forms are usually not initialed and dated.

Overall the data are of acceptable quality. The samples appear to have analyzed as per the cited methods, and the validation worksheets generally follow the guidelines specified

in *U.S. EPA National Functional Guidelines for Organic Data Review* (February 1994) and *U.S. EPA National Functional Guidelines for Inorganic Data Review* (February 1994). Only sample results were provided for the grain size analyses, so these were not validated.

In addition to evaluating the validation reports and worksheets, EcoChem also performed a full validation of the data packages. The results of the validation by EcoChem were compared to the validation performed by BBL. The two validations were mostly in agreement; however, BBL estimated a few TOC results and EcoChem did not. The changes would not significantly impact the reported data. As determined by this review, the data, as qualified, is usable for the intended purpose.

3.2.34 2001 FRG/BBL WATER COLUMN-HIGH FLOW DATA

BBL collected surface water, particulate, and XAD filter samples in 2001 for the FRG. The samples were collected as part of the Fox River 2001 Water Column – High Flow study. Samples were analyzed for PCB Aroclors, PCB congeners, TSS, TVSS, and TOC. The data set consisted of 615 samples. Not all samples were analyzed for all tests.

EcoChem performed a review of the FRG 2001 data validation conducted by BBL. EcoChem evaluated the validation worksheets and reports for completeness and technical agreement. The samples were analyzed by EPA SW-846 methodology and other miscellaneous EPA methods. The validation report states that the qualifiers are "in accordance with National Functional Guidelines." The date of the version of Functional Guidelines used is not provided. The validation worksheets do not provide the name(s) of the validator(s), or the date that the validation was performed. The sample result summary forms are usually not initialed and dated.

The samples appear to have analyzed as per the cited methods, and the validation worksheets generally follow the guidelines specified in *U.S. EPA National Functional Guidelines for Organic Data Review* (February 1994) and *U.S. EPA National Functional Guidelines for Inorganic Data Review* (February 1994).

Many of the surrogate recovery values were less than the acceptance limit and less than 10 percent for the PCB Aroclor analyses. The validation reports state that this was caused by the Florisil cleanup. The reports further state that the Florisil had a negative impact on select peaks (typically Aroclor 1242), and that the results for the affected Aroclors were recalculated using non-impacted peaks. On the sample result summary forms, the reported value was lined out and a revised (elevated) concentration was hand entered.

It is not possible to evaluate the revisions without the raw data. Also, none of the calculations were provided, and so cannot be verified. During a more detailed review of the data, EcoChem would most likely estimate the data. If revised concentrations were appropriate, EcoChem would request that the laboratory recalculate the concentrations and issue a revised sample result summary form.

For the PCB congener analyses, no changes or additional qualifiers are recommended by EcoChem. However, when qualifiers were issued based on blank contamination, the sample result summary forms were not qualified as recommended. Rather, the reporting limits were elevated, but no "U" qualifier was added to the summary form. During a more detailed review, EcoChem would add the qualifiers. For the general chemistry parameters (TSS, TVSS, and TOC), no changes or additional qualifiers are recommended by EcoChem. A more detailed review of the data would most likely not result in additional qualifiers. The data, as qualified, are usable for the intended purpose.

3.3 DATA USABILITY

3.3.1 FULLY VALIDATED DATA

The following data sets have been validated by an independent party and are considered useable, as qualified:

- 1994 GAS/SAIC Sediment Collection
- 1994 Woodward-Clyde Deposit A Sediment Collection
- 1995 WDNR Sediment Data Collection
- 1996 USFWS NRDA Fish Tissue Data Collection
- 1996 WDNR Fish Tissue Data Collection
- 1998 Demonstration Project Data - SMU 56/57
- 1998 RETEC RI/FS Supplemental Data Collection
- 1996 FRG/BBL Sediment/Tissue Data Collection
- 1997 Demonstration Project Data - Deposit N
- 1992/93 BBL Deposit A Sediment Data Collection
- 1998 FRG/Exponent Data Collection
- 1998 FRG/Blasland, Bouck, and Lee, Inc. Sediment/Tissue Data Collection
- 1998 Deposit N Pilot Remediation-Pre-Dredge, Post-Dredge, Operation Monitoring, and Environmental Monitoring Data
- 1999 Demonstration Project Data- SMU 56/57
- State of Michigan Fish Consumption Advisory Data
- Lake Michigan Tributary Monitoring Data
- 1999 Demonstration Project Data - SMU 56/57
- Minergy EPA SITE Program Data
- 2000/2001 FRG/CH2M Hill Sediment & Wood Chip Data;

- 2000 FRG/BBL Supplemental Monitoring Program Data: Surface Water;
- 2000/2001 FRG/BBL Supplemental Monitoring Program Data: Sediment Data;
- 2001 FRG/BBL Green Bay Sediment Sampling Data; and
- 2001 FRG/BBL Water Column-High Flow Data.

Although the data sets (listed above) were found to be validated and useable, it must be stressed that there were individual data points that were rejected. These rejected data points have not been used in support of the RI/FS or RA.

3.3.2 SUPPORTING DATA

The following data sets have not been validated and, in general, should be used only as supporting data. The data have been collected within different programs and with different data quality objectives therefore, varying degrees of supporting documentation may be available.

- 1989/90 Fox River Mass Balance Study
- 1989/90 Green Bay Mass Balance Study (GLNPO)
- 1993 Triad Assessment
- 1993-1996 USFWS Tree Swallow Data Collection
- 1994-1995 Cormorant Data Collection
- 1997 USFWS NRDA Waterfowl Tissue Data Collection
- 1997 WDNR Caged Fish Bioaccumulation Study Data
- Fox River Fish Consumption Advisory Data
- Stromberg Eagle Data Collection
- USGS NAWQA Data
- WDNR Wildlife Tissue Data
- WPDES Permit Influent Data
- Lake Michigan Mass Balance Data
- Minergy Mineralogical Data
- Lower Fox River Background Metals Assessment
- FoxView Data

3.3.3 INDETERMINATE DATA

The following data sets have not been validated and have not been subjected to a data quality review. This is due to complete lack of supporting QA/QC documentation; or,

EcoChem did not receive the hardcopy data and documents by the date of this report. At this time the overall quality of these data sets is unknown and the data should be used with that fact in mind.

- Ankley and Call

Table 3-1
Data Set Analysis

Data Source	Number of Samples	Matrices[1]	Analyses Conducted[2]	Number of Records	Number of Files in Delivery	File Type	Report Section	Earliest Year of Collection	Latest Year of Collection
1989 - 1990 Fox River Mass Balance Study	1967	S,W	PCB-A, PCB-C, W	25457	6	Spreadsheet	3.2.01	1989	1990
1989 - 1990 Green Bay Mass Balance Study (GLNPO)	2069	S,T,W	B, PCB-C, W	201701	92	Database	3.2.01	1987	1990
1992 - 1993 BBL Deposit A Sediment Data	117	S,W	M, P/H, PCB-A, SVOA, V, W	1094	1	Spreadsheet	3.2.02	1992	1993
1993 Triad Assessment	27	S	B, M, P/H, PCB-A, SVOA, W	631	11	Spreadsheet	3.2.03	1992	1993
1994 GAS/SAIC Sediment Collection	253	S	DXN, M, P/H, PCB-A, SVOA, V, W	5654	6	Spreadsheet	3.2.04	1994	1994
1995 WDNR Sediment Data	488	S	M, PCB-A, W	6433	8	Spreadsheet	3.2.05	1995	1995
1996 FRG/BBL Sediment/Tissue Data	25	S,T	B, PCB-C, W	2771	6	Spreadsheet	3.2.06	1996	1996
1995 - 1996 WDNR Tissue Data	200	T	B, PCB-A, W	1673	1	Spreadsheet	3.2.07	1995	1996
1996 - USFWS NRDA Tissue Data	376	T	DXN, P/H, PCB-A, PCB-C, W	16017	5	Spreadsheet	3.2.08	1996	1999
1993-1996 Tree Swallow Data	200	T	B, DXN, P/H, V, W	5429	2	Database	3.2.09	1993	1993
1994-1995 Cormorant Data	193	T	B, DXN, P/H, PCB-C, W	6178	2	Database	3.2.09	1994	1995
1997 USFWS NRDA Waterfowl Tissue Data	70	T	B, P/H, PCB, V, W	1680	2	Database	3.2.09	1997	1997
Fox River Fish Consumption Advisory Data: 1998 WDNR Fish Consumption Data	130	T	B,M, PCB-A, W	777	1	ASCII	3.2.10	1998	1998
Fox River Fish Consumption Advisory Data	1766	S,T	B, DXN, M, P/H, PCB-A, PCB-C, SVOA, V, W	11620	2	ASCII	3.2.10	1971	1996
WDNR Wildlife Tissue Data	417	T	B, M, P/H, PCB-A	2532	3	Database	3.2.11	1984	1996
Lake Michigan Tributary Monitoring Data	88	W	M, P/H, PCB-C, V	5722	5	Spreadsheet	3.2.12	1994	1995
Stromberg Eagle Data	31	T	B, DXN, P/H, PCB-A, PCB-C, SVOA, V, W	954	1	ASCII	3.2.13	1991	1996
USGS NAWQA Data	441	S,T,W	B, M, P/H, PCB, SVOA, V, W	11879	21	Spreadsheet	3.2.14	1992	1997
1994 Woodward-Clyde Deposit A Sediment Data	66	S	PCB-A, W	585	12	Spreadsheet	3.2.15	1994	1994
WPDES Permit Influent Data	8	W	B, DXN, M, P/H, PCB-A, RAD, SVOA, V, W	847	1	Spreadsheet	3.2.16	1993	1997
Lower Fox River Background Metals Assessment Data	14	W	M	78	1	Spreadsheet	3.2.17	1991	1993
1997 WDNR Caged Fish Bioaccumulation Study Data	25	S,T	B, PCB-C, W	1672	2	Spreadsheet	3.2.18	1997	1997
1997 Demonstration Project Data - Deposit N	10	S	M, PCB, W	83	1	Spreadsheet	3.2.19	1997	1997
1997 Demonstration Project Data - SMU 56/57	295	S,W	DXN, M, P/H, PCB-A, SVOA, V, W	3114	12	Spreadsheet	3.2.20	1997	1998
1998 RETEC RI/FS Supplemental Data	252	S,T	B, DXN, M, P/H, PCB-A, PCB-C, SVOA, V, W	10781	1	ASCII	3.2.21	1998	1998
Lake Michigan Mass Balance Data	6987	A,S,T,W	M, P/H,PCB-C, V, W	91621	211	Database	3.2.22	1993	1996
Minergy Mineralogical Data	15	S	W	219	1	Spreadsheet	3.2.23	1995	1999
1998 FRG/Exponent Data	225	T	B, M, P/H, PCB-A, PCB-C, W	17708	3	Database	3.2.24	1998	1998

Table 3-1
Data Set Analysis

Data Source	Number of Samples	Matrices[1]	Analyses Conducted[2]	Number of Records	Number of Files in Delivery	File Type	Report Section	Earliest Year of Collection	Latest Year of Collection
1998 FRG/BBL Sediment/Tissue Data	1315	S,T,W	B, M, P/H, PCB-A, PCB-C, RAD, SVOA, W	18824	1	Database	3.2.25	1998	1998
1998 - 1999 Deposit N Data: Post-Dredge	43	S	PCB-A, PCB-C, W	690	8	Spreadsheet	3.2.26	1999	1999
1998 - Deposit N Data: Pre-Dredge	53	S	PCB-A, PCB-C, W	1437	6	Spreadsheet	3.2.26	1998	1998
1998/1999 Deposit N Data: Remediation	197	T,W	PCB-C, W	10264	1	Spreadsheet	3.2.26	1998	1999
1998 - 1999 Deposit N Data: Operational Monitoring	12	S	M, PCB-A, W	123	1	Spreadsheet	3.2.26	1998	1998
Ankley and Call Data	62	PW,S,T,W	DXN, M, P/H, PCB, SVOA, W	1607	0	Hardcopy	3.2.27	1989	1989
State of Michigan Fish Consumption Advisory Data	434	T	B, DXN, M, P/H, PCB-A, W	6979	1	Database	3.2.28	1983	1999
1999 FRG Demonstration Project Data - Deposit N & SMU 56/57	2408	A,O,S,W	PCB-A, PCB-C, M, W, V, SVOA, P/H, DXN	46389	28	Database/ Spreadsheet	3.2.29	1999	1999
2000 - 2001 FRG/CH2M Hill Sediment/Wood Chip Data	428 [a]	S,WC	PCB-A, GRO, DRO, M, V, SVOA, CN	6428	1	Database	3.2.30	2000	2001
2000 FRG/BBL Supplemental Monitoring Program Data: Surface Water [b]	205	W, XAD	PCB-A, PCB-C, W				3.2.31	2000	2000
2000 - 2001 FRG/BBL Supplemental Monitoring Program Data: Sediment [b]	158	S	PCB-A, PCB-C, W				3.2.32	2000	2001
2001 FRG/BBL Green Bay Sediment Sampling Data [b]	30	S	PCB-A, W				3.2.33	2001	2001
2001 FRG/BBL Water Column - High Flow Data [b]	615	W, XAD	PCB-A, PCB-C, W				3.2.34	2001	2001
Minergy EPA SITE Data	90	A,O,S,W	PCB-C, M, W, V, SVOA, DXN	8053	5	Spreadsheet	na	2001	2001
Total: 41 Data Sets	**22377**			**535704**	**472**				

[1]Matrices

S = Sediment
T = Tissue
W = Water
PW = Sediment Pore Water
A = Ambiant Air
WC = Wood Chip
XAD = filters

[2]Analyses

PCB-A = PCB Aroclor
PCB_C = PCB Congener
PCB = Total PCB only
M = Metals
W = Wet Chemistry (including all Physical and Conventional data)
GRO = gas range organics
DRO = diesel range organics
V = Volatiles
SVOA = Semi-volatiles
P/H = Pesticides/Herbicides
DXN = Dioxins
B = Biological
CN = Cyanide

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

			1989 - 1990 GREEN BAY MASS BALANCE STUDY	1995 - 1996 WDNR FISH TISSUE	1996 USFWS/ HAGLER BAILLY DATA	1995 WDNR BELOW DEPERE		
Types	Parameters: / Requirements		PCBs / Sediment	PCB / Fish Tissue	PCB / Fish Tissue	PCBs / Sediment	TOC / Sediment	Metals / Sediment
SDG#'s			University of Minnesota - Data groups; IN0042, IN0047, IN0052, IN0057, IN0061, IN0070, IN0076, IN0078, IN0037, and IN0041	SLOH Fish SDG-1	Battelle Laboratory Multiple SDGs	Hazleton SDG #'s TBD2,10, 1 and 20	Hazleton SDG #'s TBD2,10, 1 and 20	Hazleton SDG #'s TBD2, and 20
Data Review	1)	Third Party Validation Performed	Verification Only Deborah Swackhamer, Ph. D.	MA Kuehl Co	EcoChem	Y/MAKuehl	Y/MAKuehl	Y/MAKuehl
Deliverables	1)	Electronic Deliverables	Yes	Yes	Yes	Yes	Yes	Yes
	2)	Hard copy	Some - Not sure if this is a complete set	Yes	Yes	Some	Some	Some
Data Review Details	1)	Package Completeness	Not determined	Yes	Yes	Yes	Yes	Yes
	2)	Chain of Custody Procedures	Not determined	Not determined	Yes/Minor issues	Not determined	Not determined	Not determined
	3)	Holding Times	Not summarized on the QA/QC Summary report Sheet	Yes	Yes	Yes	Yes	Yes
	4)	Initial Calibration	Not summarized on the QA/QC Summary report Sheet	Y (25%)	Y(35%)	25%	Yes	Yes
		Curve - # of standards	Not summarized on the QA/QC Summary report Sheet	5pt	5pt	5pt	Daily One Pt	1point/6 point for Hg
	5)	Calibration Verification	Not summarized on the QA/QC Summary report Sheet	15%D	Varies between GC/ECD and GC/MS. <25% for 75% analytes	15%	20%	10% for metals & 20% for Hg
		Secondary Column	Not summarized on the QA/QC Summary report Sheet	25%D	Y, data not used	25% D for CC on 2nd column	NA	NA
	6)	Laboratory Blanks	Not clear.	Yes	Yes	Yes	Yes	Yes
	7)	Surrogate Recoveries, # required	Y - 50-120%	Y - 70-120%	Y - 50-125%	60-150%	NA	NA
	8)	Matrix Spike, # required	Y - 50-120%	Y - 65-125%	Y- 50-125% tri and deca 30-125% for mono and dichloro	65-125%	75-125%	75-125%
	9)	Lab Duplicate	Yes/Not clear what limits are.	Y/26% Limit	Y/50%	26%	20%	20%
		Lab Control Sample (SRM results?)	None/QAPP says that a series of blindly coded QA samples will be analyzed.	N	SRM NRC %D Carp-1 <35%	NA	NA	Y/EPA
	10)	Gel Permeation/Forisil Cleanup	Not provided	Y	Not mentioned	Y	NA	NA
	11)	Detection Limit	Not provided	50 ug/kg	Results reported to zero	50 ppb	NA	CRDL
	12)	Calc and transposition verification. Qualitative verification?	Not able to determine if this was done.	Y/Recalc	Y/Recalc and Verification	Yes/Recalc performed > 10% frequency	NA	10%
	13)	Field QC Results	Not apparent	NA	None	None	None	None
	14)	Usability Usable/Supporting	Yes	Usable	Usable	Usable	Usable	Usable
		Qualifiers	Qualifiers mentioned but not defined.	Y/Minor J Quals due to detections below PQL.	Yes - Qualifiers due to CCV %D outliers, BS results, surrogate outliers, lab dups, SRM results and inteferences	Yes - Minor J Flags due to low surrogate recovery or below PQL and above MDL.	Yes - Minor J Flags due to poor lab RPD	None

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

		1989 - 1990 GREEN BAY MASS BALANCE STUDY	1995 - 1996 WDNR FISH TISSUE	1996 USFWS/ HAGLER BAILLY DATA	1995 WDNR BELOW DEPERE		
	Parameters:	PCBs	PCB	PCB	PCBs	TOC	Metals
Types	Requirements	Sediment	Fish Tissue	Fish Tissue	Sediment	Sediment	Sediment
SAP		N/Study Plan		N	Y		
QAPP		Y		Y/Tech Memo	Y		
Lab QAM		Answer Pending/U of M SOPs?	Y	Y/Tech Memo	Y - Hazleton SOPs		

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

		LOWER LAKE MICHIGAN MASS BALANCE	1998 FOX RIVER NRDA				
Types	Parameters: / Requirements	Asst. Conventionals, Pest/PCB, Hg, Atrazine,DEA, DIA / Water (Open Lake,Tributary), Air, Sediment, Phytoplankton	PCB / Fish Tissue	PCB Congener / Fish Tissue	PCB Congener / Fish Tissue	Pesticide / Fish Tissue	Mercury / Fish Tissue
SDG#'s		BALN, GPLN, GRAN, GRLN, IUAA, IUAP, LHTL, LHTM, LHTN, LHTP, MDLH, MIAH, MNPH, RUAP, RULA, RUTA, SSSP, USTN, WSAA, WWTH, WWTN	Enchem Multiple SDGs	Michigan State University	Quanterra	Enchem Multiple SDGs	Enchem Multiple SDGs
Data Review	1) Third Party Validation Performed	No- data reviewed by QC Coordinators	Exponent	Exponent	Exponent	Exponent	Exponent
Deliverables	1) Electronic Deliverables	Yes	Yes	Yes	Yes	Yes	Yes
	2) Hard copy	Unknown	Yes	Yes	Yes	Yes	Yes
Data Review Details	1) Package Completeness	Not addressed	Y	Y	Y	Y	Y
	2) Chain of Custody Procedures	Not addressed	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
	3) Holding Times	NO DV reports provided	Y	Some exceedences Samples J/UJ	Y	Some exceedences Samples J/UJ	Y
	4) Initial Calibration	NO DV reports provided	Y	Y	Y	Y	Y
	4) Curve - # of standards	NO DV reports provided	Y	Y	Y	Y	Y
	5) Calibration Verification	NO DV reports provided	20%	20%	20%	20%	10%
	5) Secondary Column	NO DV reports provided	Y	Y	Y	Y	NA
	6) Laboratory Blanks	NO DV reports provided	Y	Y- U based on blank contamination	Y	Y	Y
	7) Surrogate Recoveries, # required	NO DV reports provided	Y	Y	Y	Y	Y
	8) Matrix Spike, # required	NO DV reports provided	Y - no quals for %R outliers	Y - no quals for %R outliers	Y - no quals for %R outliers	Y	Y
	9) Lab Duplicate	NO DV reports provided	Y - MS/MSD	Y - MS/MSD	Y - MS/MSD	Y - MS/MSD	Y
	9) Lab Control Sample (SRM results?)	NO DV reports provided	Y	Y	Y	Y	Y
	10) Gel Permeation/Forisil Cleanup	NO DV reports provided	Not Mentioned	Not mentioned	Not mentioned	Not mentioned	NA
	11) Detection Limit	NO DV reports provided	NA	NA	NA	NA	NA
	12) Calc and transposition verification. Qualitative verification?	No recalculations were provided unable to determine if transcription checks were done	No recalculations were provided unable to determine if transcription checks were done	No recalculations were provided unable to determine if transcription checks were done	No recalculations were provided unable to determine if transcription checks were done	No recalculations were provided unable to determine if transcription checks were done	No recalculations were provided unable to determine if transcription checks were done
	13) Field QC Results	Not addressed	None identified	None identified	None identified	None identified	None identified
	14) Usability Usable/Supporting	Supporting	Usable	Usable - Some results rejected for low surrogate %R	Usable	Usable	Usable
	14) Qualifiers	Y - Specific LLMB 3 character Qual codes	Y/ holdtimes, surrogate %R, LCS %R	Y/ surr %R, blank contamination -U, coplanars- J/UJ diff between GC and HRGCMS, interference, coelutions	Y/ Coelutions, greater than calibration range	Y/ Holdtimes, MS/MSD %R, Surr %R, PCB interference - all + J	Y/ Duplicate RPD

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

		LOWER LAKE MICHIGAN MASS BALANCE	1998 FOX RIVER NRDA				
	Parameters:	Asst. Conventionals, Pest/PCB, Hg, Atrazine,DEA, DIA	PCB	PCB Congener	PCB Congener	Pesticide	Mercury
Types	Requirements	Water (Open Lake,Tributary), Air, Sediment, Phytoplankton	Fish Tissue	Fish Tissue	Fish Tissue	Fish Tissue	Fish Tissue
SAP							
QAPP							
Lab QAM							

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

			1994 SAIC/GAS REMEDIAL INVESTIGATION/FEASIBILITY STUDY DATA SETS							
Types	Parameters: / Requirements		PCBs Sediment	PCBs Sediment	PCBs Sediment	PCBs Sediment	PCBs Sediment	PCBs Sediment	PCBs Sediment	PCBs Sediment
SDG#'s			ARI M172	ARI M174	ARI M176	ARI M177	ARI M178/M179/M364	ARI M365	ARI M367/M368	ARI M370
Data Review	1)	Third Party Validation Performed	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC
Deliverables	1)	Electronic Deliverables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2)	Hard copy	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed
Data Review Details	1)	Package Completeness	Y	Y	Y	Y	Y	Y	Y	Y
	2)	Chain of Custody Procedures	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined
	3)	Holding Times	Y (Frozen)	Y/Some exceed	Y	Y	Y/some exceedances. one sample qualifed J for gross exceedances (M178)	Yes exceedances. several sample qualifed J for gross exceedances (M365)	Yes/Minor violations	Yes/Minor violations
	4)	Initial Calibration	Y	Y	Y	Y	Y	Y	Y	Y
		Curve - # of standards	3-5pt	3-5pt	5-pt	5-pt	5-pt	5-pt	5-pt	5-pt
	5)	Calibration Verification	15%D but Ave was higher. Results flagged (J/UJ).	15%D but Ave was higher. Results flagged (J/UJ).	15%D but Ave was higher. Results flagged (J/UJ).	15%D but Ave was higher. Results flagged (J/UJ).	15%D but Ave was higher. Results flagged (J/UJ).	15%D but Ave was higher. Results flagged (J/UJ).	15%D but Ave was higher. Results flagged (J/UJ).	15%
		Secondary Column	Not indicated	Not indicated	Not indicated	Not indicated	Not indicated	Not indicated	Not indicated	Not indicated
	6)	Laboratory Blanks	Y	Y	Y	Y	Y	Y	Y	Y
	7)	Surrogate Recoveries, # required	TCMX 55-115%/DCB 70-125%	TCMX 55-115%/DCB 70-125%	TCMX 55-115%/DCB 70-125%	TCMX 55-115%/DCB 70-125%	TCMX 55-115%/DCB 70-125%	TCMX 55-115%/DCB 70-125%	TCMX 55-115%/DCB 70-125%	TCMX 55-115%/DCB 70-125%
	8)	Matrix Spike, # required	5% min - 130% ma	35% min - 130% max	35% min - 130% max	35% min - 130% max	35% min - 130% max	35% min - 130% max	35 min% - 130% max	35 min% - 130% max
	9)	Lab Duplicate	N	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned
		Lab Control Sample (SRM results?)	Y	Y	Y	Y	Y	Y	Y	Y
	10)	Gel Permeation/Forisil Cleanup	Y - If necess.	Y - If necess.	Not sure	Not sure	Not sure	Not sure	Not sure	Not sure
	11)	Detection Limit	50 ppb wet wt	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	12)	Calc and transposition verification. Qualitative verification?	Y /10%?	N - No chros	ID and Quants Could not be verified. Raw data not provided	ID and Quants Could not be verified. Raw data not provided	ID and Quants Could not be verified. Raw data not provided	Data verified	N	Not verified
	13)	Field QC Results	None	None	None	Not identified	Not identified	Not identified	Not identified	Not identified
	14)	Usability Usable/Supporting	Usable	Usable	Usable	Usable	Usable	Usable	Usable	Usable
		Qualifiers	Yes - Minor quals assigned due to CCV (J/UJ)	Yes - Minor quals assigned due to CCV (J/UJ)	Yes - Minor quals assigned due to CCV, surrogate recoveries J/UJ	Yes - Minor quals assigned due to CCV, surrogate recoveries J/UJ	Yes - Minor quals assigned due to CCV, surrogate recoveries J/UJ	Yes - Minor quals assigned due to CCV, surrogate recoveries J/UJ	Yes - Minor quals assigned due to CCV, surrogate recoveries J/UJ	Yes - Minor quals assigned due to surrogate recoveries J/UJ

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

		1994 SAIC/GAS REMEDIAL INVESTIGATION/FEASIBILITY STUDY DATA SETS							
	Parameters:	PCBs	PCBs	PCBs	PCBs	PCBs	PCBs	PCBs	PCBs
Types	Requirements	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
SAP		Y							
QAPP		Y							
Lab QAM									

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

			1994 SAIC/GAS REMEDIAL INVESTIGATION/FEASIBILITY STUDY DATA SETS (cont.)						
Types	Parameters: / Requirements		Dioxins Sediment	CLP Pest/PCBs Sediment	CLP SVOCs Sediment	CLP Metals Sediment	TCLP Metals Sediment	Mercury Sediment	Mercury Sediment
SDG#'s			Triangle Lab SDG # 35589	Swanson/SDG 948521	Swanson/ SDG 948521	Swanson/SDGs 12718, 12724, 12745, 12806, 12816, 12941	Swanson/ SDGs 12718, 12724,12730, 12827, 12718, 12802, 12833, 12844	Swanson WL12941	Swanson WL12745
Data Review	1)	Third Party Validation Performed	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC
Deliverables	1)	Electronic Deliverables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2)	Hard copy	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed
Data Review Details	1)	Package Completeness	Y	Y	N/Forms 1 not supplied by lab	Y	Y	N/Forms 1 not supplied by lab	Y
	2)	Chain of Custody Procedures	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined
	3)	Holding Times	Yes/Minor violations	N/Samples sent to TL 10 days after collection	N/All samples exceeded HT and are qualifed as estimated (J, UJ).	Y/Hg results are flagged for exceeding HT by 27 to 42 days (J/UJ)	Y	N/All samples exceeded HT and are qualifed as estimated (J, UJ).	Y
	4)	Initial Calibration	Y	Y/Not consistent with CLP protocol	Y/Not consistent with CLP protocol	Y (Validator recalc HG results)	Y	Y/exceedance	Y/exceedance
		Curve - # of standards	5-pt	5-pt	5-pt	Lin Reg	Lin Reg	5pt	5pt
	5)	Calibration Verification	20%RSD	N/correct concentration not used. Certain analytes outside RT window	%15D/Some exceedances qualified samples as estimated J/UJ	1 0 % D	1 0 % D	Y/15%	Y/15%
		Secondary Column	NA	Not indicated	Not indicated	NA	NA	NA	NA
	6)	Laboratory Blanks	Y	Y	Y	Y	Y	Y	Y
	7)	Surrogate Recoveries, # required	TCFD 25-150%/TCDD 25-150%	TCMX 55-115%/DCB 70-125%	8 Required/ 18% min - 137% max	NA	NA	NA	NA
	8)	Matrix Spike, # required	TCDD/-TCDF 54-162	18/9 Required 29 min - 152 max	11 Required/11% min - 142% max	75-125%	75-125%	75-125%	75-125%
	9)	Lab Duplicate	Not mentioned	Not mentioned	Not mentioned	Y 20%/some exceedances qualified J/UJ	Y	Y	Y
		Lab Control Sample (SRM results?)	Y	Y	Y/acenapthene fell outside @53%	Y	Y	Y	Y
	10)	Gel Permeation/Forisil Cleanup	Not sure	Not sure	Not sure	N/A	N/A	N/A	N/A
	11)	Detection Limit	Elevated in some samples due to blank cont. and noise	Elevated in some samples due to blank cont. and noise	N/A	N/A	N/A	N/A	N/A
	12)	Calc and transposition verification. Qualitative verification?	Y - Sample Identifications. Sample Quant not reviewed.	Not Verifiable	Y	Y. Some calc errors.	Y	N	N
	13)	Field QC Results	Not identified	Not identified	Not identified	None	N	Y/Field Duplicate >	N
	14)	Usability Usable/Supporting	Usable	Third party validation considers it unusable.	Usable	Usable - 1 data point rejected for Zn	Usable	Usable	Usable
		Qualifiers	Yes/Due to blank cont, and elevated matrix spike recovery sample results may be biased positive (J+)	Yes/Major issues about overall quality of data. Associated with RT drift, quality of work poor.	Yes/Minor qualifications due to HT exceedances and low surr and spike recoveries (J/UJ)	Yes/Minor and Major qualifications due poor spike recoveries (J/UJ) and (R) on Zinc	No Qualifications	Yes - Minor J Flags	Yes - Minor UJ/J Flags

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

		1994 SAIC/GAS REMEDIAL INVESTIGATION/FEASIBILITY STUDY DATA SETS (cont.)						
Types	Parameters: / Requirements	Dioxins Sediment	CLP Pest/PCBs Sediment	CLP SVOCs Sediment	CLP Metals Sediment	TCLP Metals Sediment	Mercury Sediment	Mercury Sediment
SAP								
QAPP								
Lab QAM								

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

			1994 SAIC/GAS REMEDIAL INVESTIGATION/FEASIBILITY STUDY DATA SETS (cont.)				
Types	Parameters: / Requirements		Mercury Sediment	Mercury Sediment	Mercury Sediment	Mercury Sediment	Mercury Sediment
SDG#'s			Swanson WL12806	Swanson WL12812/12724/12718	Swanson WL12816/12882/12929/12922/12853/12852/12851	Swanson WL12688/12725/12783/12777	Swanson WL12693
Data Review	1)	Third Party Validation Performed	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC
Deliverables	1)	Electronic Deliverables	Yes	Yes	Yes	Yes	Yes
	2)	Hard copy	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed	Yes but not easily accessed
Data Review Details	1)	Package Completeness	Y	Y	Y	Y	Y
	2)	Chain of Custody Procedures	Not determined	Not determined	Not determined	Not determined	Not determined
	3)	Holding Times	Y	Y	N/Quals J/UJ	Y	Y
	4)	Initial Calibration	Y/exceedance	Y (Validator recalc results)	Y (Validator recalc results)	Y (Validator recalc results)	Y (Validator recalc results)
		Curve - # of standards	5pt	5pt	5pt	5pt	5pt
	5)	Calibration Verification	Y/15%	Y/15%	Y/15%	Y/15%	Y/15%
		Secondary Column	NA	NA	NA	NA	NA
	6)	Laboratory Blanks	Y	Y	Y	Y	Y
	7)	Surrogate Recoveries, # required	NA	NA	NA	NA	NA
	8)	Matrix Spike, # required	75-125%	75-125%	75-125%	75-125%	75-125%
	9)	Lab Duplicate	Y	Used MS/MSD	Y/Occ. Used MS/MSD SDG 12922 >35%	Y/Used MS/MSD	Y
		Lab Control Sample (SRM results?)	Y	Y (not always performed) CLs were 75-125%	Used MS/MSD (75-125%)	Used MS/MSD (80-120%)	Y
	10)	Gel Permeation/Forisil Cleanup	N/A	N/A	N/A	N/A	N/A
	11)	Detection Limit	N/A	N/A	N/A	N/A	N/A
	12)	Calc and transposition verification. Qualitative verification?	N	Y	Y/Recalc	Y/Recalc	Y/Recalc
	13)	Field QC Results	N	Y/Ok on rinsate/FD (12812) failed No Action	Y/Ok on rinsate/<35% on FD	Y/Ok on rinsate/<20?% on FD	Y/Ok on rinsate/OK on FD
	14)	Usability Usable/Supporting	Usable	Usable	Usable	Usable	Usable
		Qualifiers	Yes - Minor UJ/J Flags	Yes/Minor qualifications due to incorrect ICB calc.	Yes/Minor J/UJ Flags due to HT exceedances/SDG 12853 also qualifed on poor FD values.	No Qualifications	Not apparent if no or some minor qualifications

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

		1994 SAIC/GAS REMEDIAL INVESTIGATION/FEASIBILITY STUDY DATA SETS (cont.)				
Types	Parameters: / Requirements	Mercury Sediment	Mercury Sediment	Mercury Sediment	Mercury Sediment	Mercury Sediment
SAP						
QAPP						
Lab QAM						

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

			1998 FOX RIVER GROUP								
Types	Parameters: / Requirements		PCB Surface Water	Conventionals Surface Water	PCB Sediment	PCB Congeners Sediment	Pesticides Sediment	SVOC Sediment	Metals Sediment	TOC/Ammonia Sediment	PCB Fish Tissue
SDG#'s			Enchem Multiple SDGs	Enchem Multiple SDGs	Enchem Multiple SDGs	Enchem Multiple SDGs	Quanterra Multiple SDGs	Enchem Multiple SDGs	Enchem Multiple SDGs	Enchem Multiple SDGs	Enchem Multiple SDGs
Data Review	1)	Third Party Validation Performed	Blasland Bouck & Lee	Blasland Bouck & Lee	Blasland Bouck & Lee	Blasland Bouck & Lee	Blasland Bouck & Lee	Blasland Bouck & Lee	Blasland Bouck & Lee	Blasland Bouck & Lee	Blasland Bouck & Lee
Deliverables	1)	Electronic Deliverables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2)	Hard copy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data Review Details	1)	Package Completeness	Y	Y	Y	Y	Y	Y	Y	Y	Y
	2)	Chain of Custody Procedures	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
	3)	Holding Times	Y	Y/TSS samples J flagged	Y/ Dilutions done out of hold, diluted Aroclors J	Y	Y	Y/ 1 missed hold time sample J/UJ	Y	Y/ Some TOC and ammonia samples J	Y
	4)	Initial Calibration	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Curve - # of standards				NA	NA	NA	NA	NA	NA
	5)	Calibration Verification	20%	10%	20%	30% Target analytes 40% Internal stds	20%	20%	10%	10%	20%
		Secondary Column	20% qualitative only	NA	20% qualitative only	NA	20% qualitative only	NA	NA	NA	20% qualitative only
	6)	Laboratory Blanks	Y	Y	Y	Y	Y	Y	Y	Y	Y
	7)	Surrogate Recoveries, # required	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided
	8)	Matrix Spike, # required	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided	Y/ Control limits not provided
	9)	Lab Duplicate	Y - MS/MSD/ Control limits not provided	Y / Control limits not provided	Y - MS/MSD/ Control limits not provided	Y - MS/MSD/ Control limits not provided	Y - MS/MSD/ Control limits not provided	Y - MS/MSD/ Control limits not provided	Y/ Control limits not provided	Y / Control limits not provided	Y - MS/MSD/ Control limits not provided
		Lab Control Sample (SRM results?)	Y	Y	Y- not addressed	Y	Y	Y	Y	Y	Y
	10)	Gel Permeation/Forisil Cleanup	Not mentioned	NA	Not mentioned	Not mentioned	Not mentioned	Not mentioned	NA	NA	Not mentioned
	11)	Detection Limit	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12)	Calc and transposition verification. Qualitative verification?	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done
	13)	Field QC Results	Field Duplicates -OK Rinsates had contamination	Field Duplicates -OK Rinsates had contamination	Field Duplicates -OK	None identified	Field Duplicates -OK	Field Duplicates -OK	Field Duplicates -OK	Field Duplicates -OK	None identified
	14)	Usability Usable/Supporting	Usable	Usable - except some TOC/DOC rejected	Usable	Usable	Usable	Usable - except hexachlorocyclopenta-diene rejected	Usable	Usable	Usable
		Qualifiers	Y/ Aroclor 1242 ND based on rinsate cont./ UJ extraction errors/ J/UJ low surrogate % R	Y/TOC/DOC R DOC > TOC, All parameters U rinsate, TSS J hold time	Y/ Aroclor 1242 & 1254 J spectral overlap/ J dilutions out of hold time/ minor CCAL %D	Y/1 compound J/UJ CCAL D, MS/MSD/LCS low %R, poor peak resolution	N	Y/HCCP R 0% MS/MSD, minor CCAL %d, low surr %R, and missed hold time	Y/Blank contamination, low MS %R, RPD	Y/ holdtimes	Y/Aroclor 1242 & 1254 J spectral overlap, J /UJ due to extraction error

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

		1998 FOX RIVER GROUP								
	Parameters:	PCB	Conventionals	PCB	PCB Congeners	Pesticides	SVOC	Metals	TOC/Ammonia	PCB
Types	Requirements	Surface Water	Surface Water	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Fish Tissue
SAP										
QAPP										
Lab QAM										

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

			1992/1993 DEPOSIT A SEDIMENT DATA					DEPOSIT N DEMONSTRATION PROJECT 1998			
Types	Parameters: / Requirements		VOA Soil	SVOC Soil	PCB Soil	Pesticides Soil	Metals/CN Soil	PCB Slurry, Soil, Liquid	PCB Congener Slurry, Soil, Liquid	TOC/DOC/TSS Slurry, Soil, Liquid	PCB Sludge
SDG#'s			Hazleton 104116 203257	Hazleton 104116 203242	Hazleton SDG-1, SDG-2, SDG-3, SDG-4, SDG-5	Hazleton 104135 203256	Hazleton BASD34 SD01 BASD08	Severn Trent VT. Fox9, Fox10, Fox11, Fox12, Fox13, Fox14, Fox16	Severn Trent VT. Fox9, Fox10, Fox11, Fox12, Fox13, Fox14, Fox16	WSLH	Severn Trent VT. Fox17 and Fox18
Data Review	1)	Third Party Validation Performed	EcoChem	EcoChem	EcoChem	EcoChem	EcoChem	MA Kuehl Co	MA Kuehl Co	MA Kuehl Co	MA Kuehl Co
Deliverables	1)	Electronic Deliverables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2)	Hard copy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data Review Details	1)	Package Completeness	Y	Y	Y	Y	Y	Yes	Yes	Yes	Yes
	2)	Chain of Custody Procedures	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
	3)	Holding Times	Y	Y	Y	Y	Y	Y - some exceedences	Y- some results J/UJ, Some results Rejected (greater than 14 days)	Y - some exceedences	Yes
	4)	Initial Calibration	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Curve - # of standards	Y - As required by method	Y - As required by method	Y - As required by method	Y - As required by method	Y - As required by method	NA	NA	NA	NA
	5)	Calibration Verification	20%	20%	20%	20%	10%	15%	Y	Y	Y
		Secondary Column	NA	NA	Yes	Yes	NA	Y - some %D exceedences	Y	NA	Y - %D outliers
	6)	Laboratory Blanks	Y - Tics rejected due to contamination	Y - Tics rejected due to contamination	Y	Y	Y	Y	Y - some results U based on MB cont.	Y	Y
	7)	Surrogate Recoveries, # required	Y	Y	Y	Y	Y	Y	Y	Y	Y
	8)	Matrix Spike, # required	Y - No MS/MSD for SDG 203257 J/UJ	Y - No MS/MSD for SDG 203242 J/UJ	Y	Y	Y	Y	Y	Y	Y
	9)	Lab Duplicate	Y - No MS/MSD for SDG 203257 J/UJ	Y - No MS/MSD for SDG 203242 J/UJ	Y	Y	Y	Y	Y	Y	Y
		Lab Control Sample (SRM results?)	Y - No LCS for SDG 203257 J/UJ	Y - No LCS for SDG 203242 J/UJ	Y	Y	Y	Y- some %R outliers	Y- some %R outliers	Y	Y- some %R outliers
	10)	Gel Permeation/Forisil Cleanup	NA	NA	NA	NA	NA	Not addressed	Not Addressed	NA	Not Addressed
	11)	Detection Limit	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12)	Calc and transposition verification. Qualitative verification?	Yes	Yes	Yes	Yes	Yes	Y	Y	Yes	Yes
	13)	Field QC Results	None identified	None identified	Yes	Yes	None identified	Y	Y - some outliers, no quals assigned	Y - DOC RPD outlier	Y
	14)	Usability Usable/Supporting	Usable - Tics rejected due to contamination	Usable- Tics rejected due to contamination	Usable	Usable	Usable	Usable - some results rejected due to possible cross contamination	Usable - some results rejected due to exceeded holding times	Usable	Usable
		Qualifiers	Y/ blank contamination U, Ical RSD, CCAL%D, no LCS MS/MSD TICs rejected due to blank contamination	Y/ blank contamination, CCAL %D, Internal std %R, NO LCS MS/MSD, TICs rejected due to blank contamination	Y/ surrogate %R, LCS %R, Field Dup RPD 1242	Y/ RPD between main and confirmation columns NJ	Y/ Blank contamination, ICV %R CN, MS %R, GFAA post spike %R	Y- cooler temps, CCAL %D, holding time, LCS%R, Dual Column % D	Y- hold times, cooler temps, CCAl %D, method blank contamination, LCS %R, over cal	Y - holding times, cooler temps, Field Dup RPD, DOC>TOC	Y - Dual column %D outliers

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

		1992/1993 DEPOSIT A SEDIMENT DATA					DEPOSIT N DEMONSTRATION PROJECT 1998			
	Parameters:	VOA	SVOC	PCB	Pesticides	Metals/CN	PCB	PCB Congener	TOC/DOC/TSS	PCB
Types	Requirements	Soil	Soil	Soil	Soil	Soil	Slurry, Soil, Liquid	Slurry, Soil, Liquid	Slurry, Soil, Liquid	Sludge
SAP										
QAPP										
Lab QAM										

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

Types	Parameters: / Requirements		PCB Congener / Sludge
SDG#'s			Severn Trent VT. Fox17 and Fox18
Data Review	1)	Third Party Validation Performed	MA Kuehl Co
Deliverables	1)	Electronic Deliverables	Yes
	2)	Hard copy	Yes
Data Review Details	1)	Package Completeness	Yes
	2)	Chain of Custody Procedures	Acceptable
	3)	Holding Times	Yes
	4)	Initial Calibration	Y
		Curve - # of standards	NA
	5)	Calibration Verification	Y
		Secondary Column	Y
	6)	Laboratory Blanks	Y
	7)	Surrogate Recoveries, # required	Y
	8)	Matrix Spike, # required	Y - some %R and RPD outliers
	9)	Lab Duplicate	Y
		Lab Control Sample (SRM results?)	Y
	10)	Gel Permeation/Forisil Cleanup	Not addressed
	11)	Detection Limit	NA
	12)	Calc and transposition verification. Qualitative verification?	Yes
	13)	Field QC Results	Y - some outliers, no quals assigned
	14)	Usability Usable/Supporting	Usable
		Qualifiers	Y - CCAL %D outliers, MS/MSD %R and RPD outliers, LCS %R, over cal

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

	Parameters:	PCB Congener
Types	Requirements	Sludge
SAP		
QAPP		
Lab QAM		

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

			DEPOSIT N DEMONSTRATION PROJECT 1998 (cont.)				2000/2001 FOX RIVER GROUP-LITTLE LAKE BUTTE DES MORTS				
Types	Parameters: / Requirements		TOC Sludge	PCB Congener Surface Water	PCB Fish	PCB Congener Minnow	VOC Wood Chips	Cyanide Sediment	PCB Aroclors Sediment	Metals Sediment	Semivolatiles Sediment
SDG#'s			Severn Trent VT. Fox17 and Fox18	WSLH	Severn Trent VT. Fox7	WSLH	Enchem 913915	Enchem 913915	Enchem Multiple SDGs	Enchem 913426/913915	Enchem 913426/913904
Data Review	1)	Third Party Validation Performed	MA Keuhl Co	MA Keuhl Co	MA Keuhl Co	MA Keuhl Co	CH2M Hill	CH2M Hill	CH2M Hill	CH2M Hill	CH2M Hill
Deliverables	1)	Electronic Deliverables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2)	Hard copy	Yes	Yes	Yes	Yes	Yes-but only Form 1s reviewed by EcoChem	Yes-but only Form 1s reviewed by EcoChem	Yes-but only Form 1s reviewed by EcoChem	Yes-but only Form 1s reviewed by EcoChem	Yes-but only Form 1s reviewed by EcoChem
Data Review Details	1)	Package Completeness	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2)	Chain of Custody Procedures	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
	3)	Holding Times	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	4)	Initial Calibration	Y	Y	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Curve - # of standards	Y	Y	Yes	Yes	5 pt	Yes-criteria met	Yes-criteria met	Lin Reg	5 pt
	5)	Calibration Verification	Y	Y	Yes	Yes	unknown	Yes	Yes	Yes	Yes
		Secondary Column	NA	Y	Yes	Yes	NA	NA	qualitative only	NA	NA
	6)	Laboratory Blanks	Y	Y - some results U because of MB cont.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	7)	Surrogate Recoveries, # required	Y	Y	Yes	Yes	Y/ Low recoveries	NA	Yes	NA	Y/ 2 samples J/UJ for low %R.
	8)	Matrix Spike, # required	Y	N- not enough sample	No	Y	No	Y/ Lab limits	Yes/MS/MSD	Yes	Yes-MS/MSD - 1 sample J for high %R
	9)	Lab Duplicate	Y - some RPD outliers	Y	Yes	Yes	No	Yes-criteria met	No	Yes	No
		Lab Control Sample (SRM results?)	Y - one outlier	Y	Yes	Yes	Yes-some low recoveries	Yes-criteria met	Yes-acceptable	Yes-acceptable	Yes-acceptable
	10)	Gel Permeation/Forisil Cleanup	NA	Not addressed	Not Adressed	Not Addressed	NA	NA	Not mentioned	NA	Not mentioned
	11)	Detection Limit	NA	NA	NA	NA	ppb-varies by sample and compound	ppm-varies by sample	ppb-varies by sample	ppm-varies by sample and analyte	ppb-varies by sample and compound
	12)	Calc and transposition verification. Qualitative verification?	Yes	Yes	Yes	Yes	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done
	13)	Field QC Results	Y - some RPD outliers	Y - some outliers, no quals assigned	Yes	Yes	Field Dups & Trip Blanks -OK	Field Duplicates -OK	Field Duplicates -some high RPD with no qualifiers	Field Dup for Hg only	Field Duplicates -OK
	14)	Usability Usable/Supporting	Usable	Usable	Usable	Usable	Usable	Usable	Usable	Usable	Usable
		Qualifiers	Y- LCS %R, Dup RPD, Field Dup RPD	Y- blank contamination, results < LOQ,	No	Y- reported results < LOQ	Yes-All results U/UJ for low surrogate %R	No	Yes/ Many Aroclor 1254 & some 1260 qualified J due to spectral overlap	No	Yes/due to surrogate and MS %R outliers

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

		DEPOSIT N DEMONSTRATION PROJECT 1998 (cont.)				2000/2001 FOX RIVER GROUP-LITTLE LAKE BUTTE DES MORTS				
	Parameters:	TOC	PCB Congener	PCB	PCB Congener	VOC	Cyanide	PCB Aroclors	Metals	Semivolatiles
Types	Requirements	Sludge	Surface Water	Fish	Minnow	Wood Chips	Sediment	Sediment	Sediment	Sediment
SAP						Not provided	Not provided	Not provided	Not provided	Not provided
QAPP						Not provided	Not provided	Not provided	Not provided	Not provided
Lab QAM						Not provided	Not provided	Not provided	Not provided	Not provided

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

				2000 FOX RIVER GROUP-SUPPLEMENTAL MONITORING PROGRAM-SURFACE WATER			2000/2001 FOX RIVER GROUP-SUPPLEMENTAL MONITORING PROGRAM-SEDIMENTS		
Types	Parameters: / Requirements		Fuels (GRO/DRO) Sediment	Conventionals Water & XAD Resins	PCB Aroclors Water & XAD Resins	PCB Congeners Water & XAD Resins	Conventionals Sediment	PCB Aroclors Sediment	PCB Congeners Sediment
SDG#'s			Enchem 913426/913904	Enchem Multiple SDGs	Enchem Multiple SDGs	Enchem & STL Multiple SDGs	Enchem & CQM Multiple SDGs	Enchem Multiple SDGs	STL GOL020161
Data Review	1)	Third Party Validation Performed	CH2M Hill	BBL	BBL	BBL	BBL	BBL	BBL
Deliverables	1)	Electronic Deliverables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2)	Hard copy	Yes-but only Form 1s reviewed by EcoChem	Yes-but only Form 1s reviewed by EcoChem	Yes-but only Form 1s reviewed by EcoChem	Yes-but only Form 1s reviewed by EcoChem	Yes-but only Form 1s reviewed by EcoChem	Yes-but only Form 1s reviewed by EcoChem	Yes-but only Form 1s reviewed by EcoChem
Data Review Details	1)	Package Completeness	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2)	Chain of Custody Procedures	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
	3)	Holding Times	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	4)	Initial Calibration	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Curve - # of standards	Lin Reg	Per method	Lin Reg	5 pt	Per method	Lin Reg	5 pt
	5)	Calibration Verification	Yes	Yes	Yes	Yes-all samples in 3 SDG qualified 1+ congeners J/UJ	Per method	Yes	Yes
		Secondary Column	NA	NA	qualitative only	NA	NA	qualitative only	NA
	6)	Laboratory Blanks	Yes	Yes	Yes	Yes-several congeners in several samples qualified U	Yes-TOC only	Yes	Yes
	7)	Surrogate Recoveries, # required	Yes	NA	Yes	Yes	NA	Yes	Yes
	8)	Matrix Spike, # required	No	Yes- TOC only	Yes-MS/MSD	No	Yes-TOC only; 20 samples J for high %R	Yes-MS/MSD	No
	9)	Lab Duplicate	No	Yes-criteria met	No	No	No duplicates for grain size & %moisture	No	No
		Lab Control Sample (SRM results?)	Yes-acceptable	Yes-criteria met	Yes-acceptable	Yes-acceptable	Yes-TOC only	Yes-acceptable	No
	10)	Gel Permeation/Forisil Cleanup	Not mentioned	NA	Not mentioned	NA	NA	Not mentioned	NA
	11)	Detection Limit	ppm-varies by sample	ppm-varies by sample	ppb-varies by sample	ppb-varies by sample & congener	TOC-ppm-varies by sample	ppb-varies by sample	ppt-varies by sample & congener
	12)	Calc and transposition verification. Qualitative verification?	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done
	13)	Field QC Results	Field Duplicates -all DRO results J due to high RPD	Field Duplicates -OK	Field Duplicates -some high RPD with no qualifiers	Field Dup for Hg only	Field Duplicates TOC only	Field Duplicates -acceptable	No
	14)	Usability Usable/Supporting	Usable	Usable	Usable	Usable	Usable	Usable	Usable
		Qualifiers	Yes/all DRO results J due to high RPD	No	No	Yes-due to blank cont., ccal, IS %R, & linear range exceed.	Yes-TOC 20 samples J for high % R	No	No

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

			2000 FOX RIVER GROUP-SUPPLEMENTAL MONITORING PROGRAM-SURFACE WATER			2000/2001 FOX RIVER GROUP-SUPPLEMENTAL MONITORING PROGRAM-SEDIMENTS		
	Parameters:	Fuels (GRO/DRO)	Conventionals	PCB Aroclors	PCB Congeners	Conventionals	PCB Aroclors	PCB Congeners
Types	Requirements	Sediment	Water & XAD Resins	Water & XAD Resins	Water & XAD Resins	Sediment	Sediment	Sediment
SAP		Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided
QAPP		Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided
Lab QAM		Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

			2001 FOX RIVER GROUP-GREEN BAY SEDIMENT SAMPLING		2001 FOX RIVER GROUP-WATER COLUMN - HIGH FLOW STUDY		
Types	Parameters: / Requirements		Conventionals Sediment	PCB Aroclors Sediment	Conventionals Water & XAD Resins	PCB Aroclors Water & XAD Resins	PCB Congeners Water & XAD Resins
SDG#'s			Enchem & CQM 914351, 914390	Enchem 914351, 914390	Enchem Multiple SDGs	Enchem Multiple SDGs	Enchem & STL Multiple SDGs
Data Review	1)	Third Party Validation Performed	EcoChem & BBL	EcoChem & BBL	BBL	BBL	BBL
Deliverables	1)	Electronic Deliverables	Yes	Yes	Yes	Yes	Yes
	2)	Hard copy	Yes	Yes	Yes-but only Form 1s reviewed by EcoChem	Yes-but only Form 1s reviewed by EcoChem	Yes-but only Form 1s reviewed by EcoChem
Data Review Details	1)	Package Completeness	Yes	Yes	Yes	Yes	Yes
	2)	Chain of Custody Procedures	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
	3)	Holding Times	Yes	Yes	Yes-several TVS samples J/UJ	Yes	Yes
	4)	Initial Calibration	Yes	Yes	Yes	Yes	Yes
		Curve - # of standards	Per method	Lin Reg	Per method	Lin Reg	5 pt
	5)	Calibration Verification	Per method	Yes	Per method	Yes	Yes-all samples in 1 SDG qualified 1+ congeners J/UJ
		Secondary Column	NA	qualitative only	NA	qualitative only	NA
	6)	Laboratory Blanks	Yes-TOC only	Yes	Yes-TOC only	Yes	Yes-10 SDG had mult. congeners qualified U
	7)	Surrogate Recoveries, # required	NA	Yes-1 sample J due to high % R	NA	Yes-1 sample J/UJ & 1 sample J/R due to low %R	Yes-several results R due to low %R; several SDG J/UJ due to low % R
	8)	Matrix Spike, # required	Yes-TOC only MS/MSD	Yes-MS/MSD	Yes-TOC only; 20 samples J for high %R	Yes-MS/MSD	No
	9)	Lab Duplicate	No duplicates for grain size & %moisture	No	No duplicates for grain size & %moisture	No	No
		Lab Control Sample (SRM results?)	Yes-TOC only	Yes-acceptable	Yes-TOC only	Yes-acceptable	Yes-results in 16 samples J/UJ due to low %R
	10)	Gel Permeation/Forisil Cleanup	NA	Not mentioned	NA	Not mentioned	NA
	11)	Detection Limit	TOC-ppm-varies by sample	ppb-varies by sample	TOC-ppm-varies by sample	ppb-varies by sample	ppt-varies by sample & congener
	12)	Calc and transposition verification. Qualitative verification?	EcoChem performed recalcs and transcription checks	EcoChem performed recalcs and transcription checks	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done	No recalculations were provided; unable to determine if transcription checks were done
	13)	Field QC Results	No	No	Field Duplicates-acceptable; Rinse blank (TOC only)-contamination	Field Duplicates -acceptable	Yes-high RPD, no action taken
	14)	Usability Usable/Supporting	Usable	Usable	Usable	Usable	Rejected (R) data not usable; all other data usable
		Qualifiers	Yes-TOC data estimated due to high RSD between injections	No	Yes-Several TOC samples U due to rinse blank contamination. Several TVS samples J/UJ due to HT exceedance.	Yes-1 sample J/UJ & 1 sample J/R due to low %R	Yes-several results R due to low %R. Results J/UJ due to surrogate, LCS, CCAL, co-elution & ion ratio outliers. Results U due to blank contamination.

TABLE 3-2
QC Elements for Data Sets
Supporting the Fox River RI/FS and RA

		2001 FOX RIVER GROUP-GREEN BAY SEDIMENT SAMPLING		2001 FOX RIVER GROUP-WATER COLUMN - HIGH FLOW STUDY		
	Parameters:	Conventionals	PCB Aroclors	Conventionals	PCB Aroclors	PCB Congeners
Types	Requirements	Sediment	Sediment	Water & XAD Resins	Water & XAD Resins	Water & XAD Resins
SAP		Not provided	Not provided	Not provided	Not provided	Not provided
QAPP		Not provided	Not provided	Not provided	Not provided	Not provided
Lab QAM		Not provided	Not provided	Not provided	Not provided	Not provided